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MANUAL OF PLANNING STANDARDS FOR SCHOOL BUILDINGS.
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DESCRIPTORS- *BUILDING DESIGN, *HEALTH NEEDS, *SCHOOL CONSTRUCTION, *SCHOOL SAFETY, *STATE STANDARDS, BUILDING MATERIALS, CONTROLLED ENVIRONMENT, SANITATION, STATE LAWS,

THIS MANUAL CONTAINS THE REQUIREMENTS AND RECOMMENDATIONS FOR DEVELOPMENT AND DESIGN IN ERECTION, REPAIR, ENLARGEMENT, AND REMODELING OF SCHOOL BUILDINGS, IN TERMS OF HEALTH, COMFORT, AND SAFETY OF PUPILS ATTENDING THE PUBLIC SCHOOLS. SPECIFIC AREAS COVERED BY THIS MANUAL INCLUDE--(1) STRUCTURE AND SAFETY PLANNING, (2) MATERIALS, (3) VISUAL ENVIRONMENT, (4) MECHANICAL PLANNING, (5) HEATING, VENTILATING, AND AIR CONDITIONING, (6) SANITARY FACILITIES, (7) GAS FACILITIES, (8) ELECTRICAL WORK, AND (9) EXISTING BUILDINGS. APPENDIXES ARE GIVEN WHICH INCLUDE--(1) A GLOSSARY, (2) ACCEPTED STANDARDS, (3) STATE LAWS, (4) REGENT'S RULES AND REGULATIONS, (5) TEMPORARY CLASSROOMS, (6) PLANNING INFORMATION, (7) REFERENCE PUBLICATIONS, (8) BIBLIOGRAPHY, AND (9) PROVISIONS FOR THE PHYSICALLY HANDICAPPED. TABLES INCLUDE--(1) DOOR EXIT DIMENSIONS, (2) LIMITATIONS ON PLASTICS, (3) THERMAL INSULATION MATERIALS, (4) WINDOW REQUIREMENTS, (5) BRIGHTNESS RATIOS, (6) THERMAL ENVIRONMENT, (7) AIR QUANTITIES, (8) FIXTURE RATIOS, AND (9) MINIMUM FOOT CANDLE REQUIREMENTS. (MM)

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MANUAL OF

PLANNING STANDARDS

FOR SCHOOL BUILDINGS

1784

SECOND EDITION

THE UNIVERSITY OF THE STATE OF NEW YORK
THE STATE EDUCATION DEPARTMENT
DIVISION OF EDUCATIONAL FACILITIES PLANNING
ALBANY

1967

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PREFACE

Among the many responsibilities of the Commissioner of Education is that of establishing and enforcing school building construction standards for the health, comfort and safety of pupils attending the public schools. Accordingly, a procedure has been established whereby all plans and specifications for the erection, repair, enlargement and remodeling of school buildings in any public school district in the State must be reviewed and approved by the Division of Educational Facilities Planning (formerly School Buildings and Grounds). However, the Division strives to extend its service far beyond the function of regulations and to offer advice and counsel to school districts and architects to help them resolve their school building problems.

In the past the requirements and recommendations regarding the development and design of school buildings have appeared in several different pamphlets, leaflets and newsletters published from time to time. Those which are presently used by the Division as its guide in its review of school project plans and specifications have now been drawn together in this Manual of Planning Standards in order that they may be more readily accessible to interested school officials, architects and engineers. We would like to emphasize several things about this publication.

1. Included herein are both minimum requirements which must be followed and recommendations which are optional. The distinction is indicated by the language used (e.g., such words as "shall", "must", etc., indicate requirements; "should", "may", etc., indicate recommendations).

2. The requirements stated herein are those which are currently in effect. Revisions are made from time to time because of changes in fire safety regulations, construction techniques, mechanical developments and changes in materials as well as by progress in education which has implications for space requirements and types of facilities. To facilitate amendments and modifications this Manual is compiled in loose-leaf form, in order to permit inserts and deletions with a minimum of confusion. As revisions are made they will be distributed in accordance with the latest established list of school administrators, architects and engineers.

3. For information relating to the layout of spaces and recommended equipment for the various curriculums, the Education Department planning booklets for such areas should still be consulted.

The Division actively seeks competent advice and welcomes suggestions as to how its requirements might be improved to keep pace with educational and technical developments. Also the Division will be glad to consider applications for approval of experimental projects which deviate from established standards if it seems reasonable to expect that important findings may result therefrom.

We urge that school officials confronted with building needs contact the Division of Educational Facilities Planning for consultation before detailed planning is undertaken. In this way costly mistakes and delays may be avoided. Even more important, early consultation will give the Division the opportunity to help districts secure the buildings best suited to their educational needs within the resources available.

GENERAL PROVISIONS

S1 GENERAL

a. Any school district which proposes to erect, repair, enlarge, or remodel a school building must investigate the necessity of submitting plans to the Division of Educational Facilities Planning in accordance with current administrative procedures. The extent and scope of the submission is dependent on size of project and type of school district.

b. School Boards, School Administrators, Architects and Engineers should thoroughly understand current requirements in respect to submission, review, and approval of plans and specifications and compliance with mandatory health, comfort and safety regulations.

S2 AUTHORITY

S2-1 Appraising and Approving School Building Plans

a. The authority of the Commissioner of Education for appraising and approving plans will be found in paragraphs 1, 2 and 3, Section 408 and Section 409 of the Education Law. (Page A-19)

S2-2 Planning Standards

a. The authority for the standards set forth in this Manual is derived from:

1. Regents Rules 207 and 208 (See Appendix A-29).
2. Commissioner's Regulations, Article XX, Sections 165, 166 and 167 (See Appendix A-29).

S3 SCOPE

a. This Manual of Planning Standards relates to all public school buildings having pupil occupancy, with the exception of those schools in the six largest cities with populations over 125,000; i.e., New York, Buffalo, Rochester, Syracuse, Albany and Yonkers.

b. It covers the construction of new buildings as described in the Local Finance Law, Article 2, Section 11; and as further described in the Regulations of the Commissioner of Education in Article XX, Sections 165 and 166. (See Appendix A-29).

c. It covers the construction of additions and alterations to existing schools as described in Article 2, Sections 12 and 13 of the Local Finance Law; and as further described in the Regulations of the Commissioner of Education in Article XX, Sections 167, 168 and 169. (See Appendix A-32)

S4 STATE BUILDING CONSTRUCTION CODE

a. Where specific requirements are not defined in this manual they shall be in substantial compliance with the latest edition of the State Building Construction Code.

S5 ACCEPTED STANDARDS

a. Structural and Mechanical design shall conform to commonly accepted good practice and to the generally "Accepted Standards" listed in the Appendix except as modified by this Manual.

S6 FINAL AUTHORITY

a. In any case of conflict between the State Building Code, the "Accepted Standards", and this Manual, the regulations outlined in this Manual shall govern. Any and all final decisions concerning requirements shall be determined by the Commissioner of Education.

S7 RESPONSIBILITY

S7-1 Architects and Engineers

a. The structural and mechanical design for new school construction, additions and alterations is the direct responsibility of the architect and engineers retained by the Owner (Board of Education).

S7-2 School Boards and School Administrators

a. In addition to the School Board's and School Administrator's responsibility for both immediate and long range planning, it is also their responsibility to provide architectural and engineering services and adequate supervision through the architect or engineer on all new construction and on all additions, alterations and renovations.

S8 REQUIREMENTS MINIMUM

a. Requirements set forth herein are minimum and should be exceeded to compensate for unusual conditions. It shall be the duty and responsibility of the architect or engineer to be certain that his plans and specifications conform to these requirements and regulations.

b. Requirements exceeding those of this manual may be deemed necessary by the Commissioner to insure health and safety where buildings are designed for flexibility, and/or with large open spaces of pupil occupancy, and/or with interior spaces, etc. (such as "loft" plans). Such a building will be reviewed as to its individual characteristics.

S9 INDEX

a. To avoid overlapping and repetition of material between the various sections, a detailed index has been provided and, as far as is practicable, information pertaining to more than one section will be dealt with only under the one heading to which it is most closely related.

S10 COMPETITIVE BIDDING AND AWARDS

a. "Or Equal" - (See Appendix A-49).

b. Non-Collusive Bidding Certification - (See Appendix A-50-1).

S11 GLOSSARY AND DEFINITIONS

a. Definition of words, terms and phrases are listed in the appendix. (See Appendix A-1).

S12 SUPPLEMENTARY PAMPHLETS AND BROCHURES

a. The Division of Educational Facilities Planning has published a series of pamphlets concerning special areas and education spaces. School planners should still refer to these in the planning stages in conjunction with the requirements and recommendations set forth in this Manual.

S13 DESIGNATION OF SPACES

a. Spaces are approved for pupil occupancy as designated on approved plans. Change of use which might affect the health, comfort and safety of the pupils shall not be made without the approval of the Commissioner.

S14 ADMINISTRATIVE PROCEDURES

a. New projects - Advancement of Plans (See Appendix A-36).

b. Additions and Alterations (See Appendix A-42).

S15 EFFECTIVE DATE

a. The standards set forth herein shall become effective on January 1, 1965 and all plans and specifications submitted for approval thereafter shall conform thereto.

PART I

STRUCTURE AND BUILDING SAFETY

S101 GENERAL

a. No construction materials shall be used and no type of construction shall be permitted which would endanger the health, safety or comfort of the children of the school.

S102 GENERAL REQUIREMENTS FOR CONSTRUCTION

a. One Story Buildings: May be Class "A", "B", or "C" construction as defined by the Local Finance Law, Article II (See Appendix A-27). With the exception of gymnasiums, ALL places of assembly having an area of more than 4000 sq. ft. (stages not included) shall be Class "A" construction, Types 1 or 2 (See Glossary).

b. Two Story Buildings: Shall be Class "A" construction, Types 1 or 2, as given in Table C202-2 of the State Building Construction Code.

c. Three or more story buildings shall be Class A, Type 1 (1a & 1b) and Type 2(2a)construction as given in Table C202-2 of the State Building Construction Code.

S103 CORRIDORS

S103-1 General

a. The designated widths of all corridors shall be the clear width, free of all fixed and movable obstructions except as noted here:

1. Drinking fountains may project 4 inches.
2. Nonrecessed radiators adjacent to exits may be used where exit doors are narrower than the corridors, but shall not project beyond exit door frames.
3. Doors serving spaces used strictly for custodial storage and similar use may swing into a corridor.
4. For places of Assembly see "EXITS", S104.
5. All other equipment such as fire extinguishers, gates, rolling grilles and radiators (except as noted in #2 above) shall be fully recessed.

b. In case of lobbies or corridors are used for purposes other than circulation, they shall be planned with full uninterrupted aisles equivalent to required corridor widths and separated by a fixed rail or other type of approved permanent divider.

c. Any point in any ground floor corridor must be within 150 feet along the line of travel of an exterior doorway. Any point in a corridor other than a ground floor corridor shall not exceed 120 feet along the line of travel to the stair enclosure of an exit stairway.

d. Corridor pockets shall be restricted to a depth of one and one-half times the width of the pocket, or to one and one-half times the width of the corridor, whichever is less.

S103-2 Main Corridors

a. A main corridor is one which serves more than four standard classrooms, or their equivalent.

b. Minimum clear widths:

1. Without lockers or wardrobes, 8'-0" wide wall to wall.
2. With wardrobes with no doors or non-projecting doors on one or both sides, 8'-0" wide face of wardrobe to face of opposite wall or face of wardrobe respectively.
3. With lockers on one side, 9'-0" wide face of locker to face of opposite wall.
4. With lockers on two sides, 10'-0" wide face to face of lockers.

c. Corridor widths for large schools, particularly high schools should be as wide as necessary for satisfactory circulation.

S103-3 Secondary Corridors

a. A secondary corridor is one which serves four or less classrooms with not more than 150 pupils, exclusive of service areas. Consideration should be given to making these secondary corridors equal to the width of the main corridors for the addition of future classrooms.

b. Minimum clear width shall be 6'-0".

c. Secondary corridors are limited to 100'-0" and must terminate in an exit.

S103-4 Passageways

a. A passageway provides access to rooms or areas not in the line of travel to main exits, such as passageways serving offices, locker rooms or kitchen areas. These passageways vary in width according to the number of occupants involved but shall have a minimum width of 44 inches.

S104 EXITS

S104-1 General

a. There shall be at least two means of egress remote from each other leading from each floor of pupil occupancy for all school buildings so that, when a pupil enters into a corridor from a room of pupil occupancy, he shall have a choice of two unobstructed means of egress in different directions. (See Exit, Appendix A-3).

b. Receiving areas cannot be used for exiting purposes.

c. During construction of building additions (and alterations), the required exits in the existing building must be kept clear and maintained.

d. Fixed and movable gates shall not be located so that they create deadend conditions for occupied spaces when the gates are in use. Portable gates are recommended over fixed gates, and their use should be restricted to after regular school hours.

e. Completely enclosed courts may not be used as an area into which pupils and people exit.

f. Exiting through other spaces within a building (other than through corridors) will not be allowed, unless specifically authorized.

g. See Section S112-2 for escape window requirements for classrooms.

h. Folding and rolling partitions and sliding or overhead doors are not to be considered as exits.

S104-2 Places of Assembly Exits

a. Places of assembly include spaces over 1800 square feet which are used for pupil occupancy such as:

1. Auditoriums
2. Cafeterias
3. Courts
4. Gymnasiums
5. Large Group Instruction Rooms
6. Little Theaters (not including the front platform or stage)
7. Music Rooms
8. Natatoriums (those with spectator space)

b. Exit widths, with the exception of those given in the formulae immediately below, are to be figured as stipulated in the Building Exits Code with 22" a unit of exit width. Generally, it is not necessary to assume places of assembly and other instructional areas as being occupied simultaneously. For each 50 persons or fraction thereof one-half unit (11") of exit width shall be allocated. The number of exit units required shall be determined in the following manner:

(1) Auditoriums:

$$\frac{\text{Floor area (s.f.)}^{*}}{600} = \text{R.E.U.}^{**}$$

(2) Stage (including wings):

$$\frac{\text{Floor area (s.f.)}}{1200} = \text{R.E.U.}$$

(3) Cafeteria:

$$\frac{\text{Floor area (s.f.)}}{600} = \text{R.E.U.}$$

(4) Courts

$$\frac{\text{Area (s.f.)}}{2000} = \text{R.E.U.}$$

(5) Gymnasiums:

$$\frac{\text{Bleacher area (s.f.)}}{250} \text{ Plus } \frac{\text{Remaining free area (s.f.)}}{600} = \text{R.E.U.}$$

(6) Natatorium:

$$\frac{\text{Bleacher area (s.f.)}}{250} \text{ Plus } \frac{\text{Remaining Floor area (s.f.)}}{1500} = \text{R.E.U.}$$

c. No single exit doorway from places of assembly shall be less than 36 inches wide and shall be a direct exit through an exterior wall, whenever this is possible. (See S104-7)

d. Exit Units - The following table indicates the number of exit units allowed for each size door opening and stair width. (See S107-4) Where required Door Exit Units are served by stairs, the stair exit units required shall be determined by entering the table from the left. Stair Exit Units required by S107-4 shall be served by door exit units of at least those determined by entering the table from the right.

TABLE 104-2d

Door Exit Units	Nominal Width of Door Opening	Nominal Width of Stairs	Stair Exit Units
1½ (22"+ 11")	36 inches	44 inches	2
2 (22"+ 22")	44 "	55 "	2½
2½ (22"+22"+11")	56 "	66 "	3
3 etc.	66 "	88 "	4
3½	78 "	99 "	4½
4	88 "	110 "	5

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*s.f. means sq. ft.
**R.E.U. means Required Exit Units

e. Exit doors for places of assembly, which open into a corridor, shall open outwards in direction of travel, shall swing through 180° and leave a clear corridor width of 5'-0" while in their greatest projecting position; or, shall be fully recessed to leave a minimum clear corridor width as required in S103-2b.

f. Exterior Doors - see Exterior Exits.

g. Stages over 500 square feet shall have remote exits. Interior doors from stages of 1000 square feet or more, and doors to work rooms and storage rooms which open on such stages shall be "B" label automatic fire doors.

h. Projection booths and rewinding rooms shall have a door at least 24" wide. Door shall be self-closing, "C" label opening outward in direction of travel.

i. Folding partitions shall have one pass door when used to separate floor areas in any gymnasium.

S104-3 Courts

a. Courts which have their perimeters completely enclosed are considered to be potential areas of pupil occupancy. Courts of less than 3000 square feet area shall have at least two exits, remote from each other, equipped with classroom function hardware operable FROM the court, with doors swinging in direction of egress. Courts of more than 3000 square feet shall be exited on the basis of one person per 20 square feet area (one exit unit per 2000 square feet) with a usual maximum of six exit units required. Exits shall be remote from each other, equipped with panic hardware operable FROM the court, with doors swinging in the direction of egress. When security is a factor, an automatic alarm system can be installed.

S104-4 Other Miscellaneous Spaces

a. Any boiler room over 300 square feet in area shall have two exits remote from each other, one of which may be by means of a ladder or thru an areaway. Outside doors should swing outward to relieve explosion pressures; inside doors, into boiler room.

b. Access to storage areas for gasoline powered equipment cannot be directly from the school, but must be through an outside door.

c. Storage for any flammable liquids must be separated from the rest of the building by two-hour fire-resistant construction and automatic "B" label door, with no hold-open device.

S104-5 Classroom Exits

A classroom corridor door shall swing into the classroom unless fully recessed.

a. Class "A" or Class "B" Heavy Timber Construction - every space of pupil occupancy over 500 square feet (not including places of assembly) shall have two separate means of exit from the space. The primary exit shall be an exit door opening directly into a corridor or directly to the outside. The second exit may be a door opening into a separate corridor which does not intersect the primary exit corridor; or, a door directly to the outside; or, a window of such size and design that will permit egress to the exterior; or, a door providing egress through adjacent spaces where specifically approved. (See Section 112-2-a, Escape Windows)

b. Class "B" or Class "C" Construction - every space of pupil occupancy shall have an exit door opening into a corridor and, in addition, a door directly to the outside.

c. Rooms under 1500 square feet - distance of travel to an exit shall not exceed 50 feet.

d. Rooms over 1500 square feet - shall have two exits remote from each other (a pass door in an overhead garage type door can be counted as a second exit.)

e. Large Classrooms - if a classroom is planned for division into two (or more) separate areas by means of movable partitions, each divided area shall have its own exit door and the doors shall be remote from each other.

f. See Section 112-2-a on Escape Windows.

S104-6 Exit Doors and Doorways

a. All doors that require panic hardware shall swing in the direction of egress. Exterior doors that do not require panic hardware may swing in. (See S105)

b. Permanent or removable mullions on pairs of doors are recommended. Openings without mullions shall be equipped with a vertical latching bolt on each leaf. Concealed vertical rod devices are recommended in aluminum or hollow metal doors.

S104-7 Exit Locations

a. Required exits shall always be located remote from each other within a room or enclosed area. Exits shall be distributed as uniformly as possible throughout the perimeter of the room; at diagonally opposite room corners, for example.

S104-8 Exit Lights - See S807 a and b for exit lights and exit light circuiting.

S105 DOOR HARDWARE

S105-1 Door Hardware for Classrooms

a. All classroom door hardware shall be a type which will always permit the door to be opened from the inside without the direct manipulation of any type of locking device.

S105-2 Panic Hardware

a. All exterior and interior exit doors from all places of assembly over 1800 square feet shall have panic hardware.

b. All exterior corridor doors shall have panic hardware except those serving less than three classrooms or service areas (such as a boiler room, kitchen or storage room).

c. Exterior doors which serve three or more classrooms by means of a common vestibule shall have panic hardware.

d. Panic hardware is not required for push-pull interior doors from places of assembly and vestibules if these doors have non-locking hardware.

S105-3 Hardware Specifications

a. Hardware specifications should include a general definitive statement which describes the type of hardware to be used on doors from spaces of pupil occupancy, from places of assembly, and exit doors to assure compliance with S105-1 and S105-2.

b. Cash allowance type hardware specifications shall include such a statement.

S106 DOORS

S106-1 Door Sizes

a. No single leaf door in an exit shall be more than 44 inches nor less than 30 inches in width. Each leaf of a PAIR of doors shall be not less than 24 inches in width.

b. For minimum door sizes from places of assembly, see S104-2c.

S106-2 Fire Doors

The following requirements for labeled doors pertain only to interior doors leading from the spaces mentioned:

a. "B LABEL" self closing doors and frames

1. Boiler or heater rooms (See S104-4).
2. Basement storage rooms.
3. Incinerator rooms.
4. Transformer vaults.
5. Stages (See S104-2-g).
6. Openings from basements and other lower level areas shall be closed off from the ground or first floor by "B LABEL" Doors.
7. Flammable liquid storage.

b. "C LABEL" self closing doors and frames.

1. Projection booths (See S104-2h).
2. Stairway enclosures (See S109-3a).

S107 STAIRWAYS

S107-1 General

a. There shall be at least two means of egress remote from each other from each floor having pupil occupancy, including basements.

b. Any stairway serving one or more floors above or below the first or principal floor level shall be enclosed with fire resistive materials and closed off at each floor to prevent passage of fire and smoke through the stairway opening.

c. Stairs serving three or more floors of pupil occupancy shall exit directly to the outside.

d. Stairs and corridors for pupil use shall be adequately lighted with artificial lighting and some natural light.

e. There shall be no storage space under any stairs or landings.

S107-2 Encroachment of Stairs

a. Stairs are only permitted to encroach on the minimum width of corridors at exit level if:

1. A clear passage width of at least 66" is provided to the exit doors. (These exit doors shall provide at least the same total width of exit opening as the passage.)

S107-3 Distance to Exits

a. The last riser or stair enclosure exit door (in direction of exit) shall be within 50 feet (along the line of travel) of an exterior exit door.

S107-4 Width of Stairs

a. One unit of stair width equals 22 inches. Partial units of stair width are not given credit in computing the adequacy of the stairs except that a ½ stair unit increment of 11" minimum is permitted.

b. Stairways of two or four lanes are recommended. Two lane (44" wide) stairways are preferred and are the minimum for main stairways. This clear, unobstructed width must be maintained throughout the entire length of the stairway (see exception under Handrails, S107-5).

c. One unit of stair width (22") is required for each 3,300 square feet or fraction thereof of gross area of the top story. For three story or higher buildings compute similarly on basis of 2,400 square feet for all stories except the top story.

d. Stairways serving places of assembly shall be computed on the basis of 60 persons per unit of width (22"), but the assumption of occupancy simultaneously with other spaces is optional.

S107-5 Handrails

a. Continuous handrails shall be provided on both sides of stairways. For stairways 88 inches (or more) wide, one, or more, center handrails shall be provided.

b. Height of handrails above and in line with risers shall be 2'-2" to 2'-8" depending upon the age of the pupils.

c. Handrails may project not more than 3½" at each side within the required stair width.

S107-6 Railings (balustrades)

a. If railings are made up of spaced bars, etc. (rather than a solid screen), the spacing shall be such as to prevent anyone from falling between them.

b. Height of balustrades for both interior and exterior stairs shall be 3'-6" above and in line with risers, and 3'-9" above the finish floor of their platforms.

S107-7 Rise/Run

a. Each stairway from story to story shall be in two or more runs with not more than 16 risers, nor less than 3 risers, per run. A straight run of stairs without any intermediate landing may be used for differences in floor elevations not to exceed seven feet. This applies only to secondary, or service, stairs.

b. Maximum riser - 7¼".

c. Minimum tread (riser to riser) - 10½".

d. The product obtained by multiplying height of riser by width of tread shall be not less than 65.

S107-8 **Landings**

a. An intermediate landing of at least the same clear width and length as the stairway width shall be provided between runs.

b. A landing of this same size shall also be provided at each floor level at the top and bottom of a run of stairs serving a through corridor. This landing shall not encroach upon the corridor width.

S107-9 **Construction**

a. All stairs and stairwells shall be built throughout of non-combustible materials. Handrails are exempt from this requirement.

b. Stair treads, risers and landings shall be solid without perforations.

c. The nosings of all stairway treads and landings shall be constructed to provide non-slip surfaces. Contrasting colors are recommended when nosing and tread are of different materials; and the construction must provide a smooth and level tread surface.

S107-10 **Secondary Stairways**

a. Spaces of limited pupil occupancy may have secondary stairs if they do not serve as a general means of escape from the building.

b. These stairs may be less than 44 inches but shall comply with requirements for main stairways in regard to fire resistiveness and, generally, in all other respects.

S107-11 **Corridor Stairs**

a. Full-width corridor stairs separating changes of level within a corridor length shall have the top riser no closer to an intersecting corridor than the width of the stairs.

S107-12 **Service Stairs**

a. Service stairs and stairwells shall be of non-combustible construction.

S107-13 **Exterior Steps**

a. Exterior steps of more than three risers leading directly from a building exit, shall be enclosed to provide protection from any accumulation of snow and ice. In the case of main entrance stairs, roofs or canopies may be satisfactory in lieu of enclosures if the specific design (number of risers, location and size of exit facility) are all found to be acceptable.

b. These and other outside steps shall have an easy rake (Riser=6", Tread=11" or better) to compensate for the hazard of ice and snow. If fully enclosed, the rake may be increased to that of a main stairway.

S107-14 Winders

a. Stairways for pupil use may not be constructed with winders. Exceptions will be made for secondary stairways serving special areas which have limited use, such as projection booths, observatories, etc.

S107-15 Fire Escapes

a. Fire escapes are not permitted on new school buildings.

b. On existing school buildings fire escapes of approved design shall be installed when other exits are determined to be inadequate for fire safety. (See Appendix A-46)

S108 RAMPS

a. Ramps shall not be used for large differences in levels. Where ramps are used, surfaces shall be non-slip and slope may not exceed a pitch of 1 in 10. Aisles in auditoriums and other spaces having sloping floors shall have non-slip surfacing.

S109 STAIRWAY EXIT ENCLOSURES

S109-1 General

a. Any stairway serving one or more floors above or below the first or principal floor level shall be enclosed with fire resistive materials and closed off at each floor to prevent passage of fire and smoke through the stairway opening.

b. Stairway enclosures shall exit directly to the outside or form part of an enclosed exitway constructed of fire resistive materials. Stairway enclosures of three stories or more must exit directly to the outside.

c. In a building with three or more stairways serving a corridor, one stairway leading down to a main lobby may be unenclosed at the lobby level.

d. Only exit doors from corridors shall open into stairway exit enclosures.

S109-2 Distance Between Stairway Exit Enclosures

a. The distance from the stair enclosure of one exit stairway to the stair enclosure of another exit stairway shall not exceed 240 feet along the line of travel. Distance from enclosure door opening to the first stair riser shall not be less than two door opening widths nor more than 10 feet.

S109-3 Doors (Stairway Exit Enclosures)

a. Doors shall be self-closing or automatic fire doors, "C LABEL" construction, or better, and shall have no-locking hardware. Doors shall swing in the direction of exit travel.

b. Self-closing doors shall be designed to be kept normally closed and shall bear signs reading "FIRE DOOR - KEEP DOOR CLOSED" in letters not less than 3 inches high.

c. Automatic doors - Doors may be held open if an automatic release device is provided so that detection of fire, smoke or the gases of combustion will bring about an interruption of electric current and cause the doors to close. Fusible links are not permitted.

S109-4 Distance to Classrooms

a. Any room having pupil occupancy shall not have a door nearer than 5 feet to an entrance door of a stair enclosure.

S110 FIRE AND SMOKE CONTROL

S110-1 Fire Protection Equipment

a. Fire extinguishers shall bear the Underwriters Label and shall be set in recesses flush with the corridor wall just above the base at such locations that no point in the corridor, lobby or stairs shall be more than 100 feet from an extinguisher.

b. Extinguishers shall also be placed convenient to the stage of the auditorium, in shops, cafeteria-kitchens, boiler rooms, chemistry laboratories, incinerator rooms and in other places which can be considered a probable source of fire.

c. If hydrants of a municipal water system are available, standard fire hydrant facilities shall be installed in accordance with S608a and S608b.

d. Sprinklers shall be installed on the stage of all auditoriums using fly scenery.

S110-2 Additions

a. It is recommended that additions be separated from existing nonfire-resistive buildings and connected only by fire-resistive passages with self-closing fire doors between the old and the new units.

S110-3 Building Location

a. The location should be such that fire apparatus can serve all points of the building.

S110-4 Firestopping

a. Concealed spaces within wall, partition, floor or stair construction shall be firestopped, or filled with non-combustible material to prevent the passage of flame, smoke, fumes, and hot gases.

S110-5 Projection Booths

a. Automatic fire shutters capable of manual operation shall be provided for all operating and observation openings.

S110-6 Stage Storage

a. Storage of scenery and equipment in space underneath the stage is not recommended.

S111 PROVIDING FOR THE PHYSICALLY HANDICAPPED

a. Starting with the preliminary design stage, consideration shall be given to the needs of the physically handicapped persons who may be using the building. The building should be designed so that they have easy access to it, and so that, once inside, they can move about and use the facilities as readily as those without hancicaps. (See Appendix A-58)

S112 GENERAL

S112-1 Shower Room Areas

a. Shower rooms shall be provided with drying spaces to prevent water from being tracked into locker rooms. Where possible, curbs should be eliminated by proper location of drains.

b. Consideration should be given to the installation of grab bars in shower rooms. These may be in combination with soap holders if soap dispensers are not installed.

S112-2 Escape Windows

a. Emergency escape windows, as required in Section 104-5-a shall be windows of such size and design that will permit emergency egress through them. It is recommended that all classroom windows permit emergency egress.

b. The minimum clear opening area for such windows is six square feet. The minimum dimension is 24 inches.

c. Double hung, casement and sliding windows are satisfactory escape windows.

S112-3 Safety Devices For Window Cleaning

a. On school buildings of three (3) stories or more safety devices shall be installed on all windows of the third story (and above) which have to be cleaned from the outside.

S112-4 Fire Blankets

a. Fire blankets for smothering clothing fires should be available in all areas where students are exposed to the hazards of any equipment having an open flame.

PART II

MATERIALS

S201 GENERAL

a. The responsibility for the selection of materials lies with the architect or engineer. The selection of finishes and materials should be made with particular regard to assuring fire-safe conditions, economical and efficient operation and maintenance. Consideration should also be given to possible savings on insurance rates by careful selection of materials.

S202 INTERIOR FINISHES

a. Interior finishes shall include the materials of walls, fixed or movable type partitions, ceilings and other exposed interior surfaces of buildings, including plaster, wood and other interior finish material and any surfacing material such as paint or wallpaper applied thereto. Interior finish includes materials affixed to the building structure as distinguished from decorations or furnishings which are not so affixed.

S202-1 Fire Hazard Classification

a. Fire hazard classification provides data in regard to flame spread, fuel contributed and smoke developed. Interior finish materials shall be classified in accordance with testing methods of the NFPA, in which asbestos cement board rates 0 on the scale and red oak lumber, 100.

b. Combustion products from fires may be more or less toxic as they include smoke, carbon dioxide, acrid vapors and in some cases carbon monoxide. The amount of life hazard presented will depend on the amount and nature of the materials involved, the conditions of burning and the degree of confinement of combustion (ventilation).

c. Regardless of the flame spread classification, any material having a life hazard greater than that indicated by the flame spread classification because of the amount and character of combustion products generated, shall be included in a lesser classification appropriate to its actual hazard, as determined by the Commissioner of Education.

S202-2 **Class A Interior Finish: Flame Spread 0-25**

a. Any material classified at 25 or less and any element thereof which, when so tested, shall not continue to propagate fire.

S202-3 **Class B Interior Finish: Flame Spread 25-75**

a. Any material classified at more than 25 but not more than 75.

S202-4 **Class C Interior Finish: Flame Spread 75-200**

a. Any material classified at more than 75 but not more than 200.

S202-5 **Class D Interior Finish: Flame Spread 200-500**

a. Any material classified at more than 200 but not more than 500.

S202-6 **Use of Interior Finishes**

a. Interior finish in school construction shall be Class A, B, or C, except as set forth below.

b. Class C interior finish shall not be used in school construction of two or more stories.

c. Class D interior finish shall not be used in school construction.

d. Class A or B interior finish shall be used in the following locations:

1. Corridors, passageways and stairways.
2. Kitchens
3. Storerooms (See S202-8-b for basement storerooms)
4. Maintenance and repair areas
5. See S202-7 for places of assembly.

S202-7 Places of Assembly

a. Interior finish shall be class A or B, except that class C may be used as wainscot not over eight feet high, and as follows. (See S202-6-b).

b. Wall covering of 1/16" or less may be used when cemented directly to walls having a fire-resistive rating of one hour or more.

c. When wall finish material is not attached directly to the wall, the supporting material shall be fire-resistive and fire stopping shall be provided at least 10 feet on center in each direction, except that plywood, wood paneling, etc. may be used over furring strips attached directly to walls having a fire resistance rating of one hour or more.

d. Insulation batts, pellets, etc. (including backing) shall be non-combustible.

e. Acoustic tile, etc. shall be non-combustible.

f. Plastics - See S204.

g. It shall be the responsibility of the Board of Education as well as the Architect, to ascertain that all curtains, fittings, and draperies in a school auditorium are fireproof or flameproof, whether included in the principal contracts or purchased as equipment items afterwards. It shall be the board's responsibility to maintain their safety by renewing the fire safety treatment as required.

S202-8 Miscellaneous Spaces

a. Walls, floors and ceilings of spaces such as boiler or heater rooms, fuel rooms, transformer vaults and incinerator rooms, shall be of two (or more) hour fire-rating. Those spaces having a roof over the entire area may have ceiling and roof construction of fire resistive materials.

b. Walls and ceilings of basement storage rooms shall be constructed of fire-resistive materials having at least one hour rating.

c. All areas for the storage of gasoline-powered equipment shall be separated from the school buildings by fire-resistive construction of two hour fire rating.

d. Storage for any flammable liquids must be separated from the rest of the building by two-hour fire resistant construction and automatic "B" Label door, with no hold-open device.

S203 HAZARDOUS GLASS AREAS

S203-1 Glass Panels

a. In exterior exit doors and vestibule doors as well as in main interior exit doors and in sidelights or glass panels adjoining, glass shall be a minimum of ¼ of an inch thick wire, tempered plate or laminated safety glass, if the glass panel extends within 48 inches of the floor.

b. Glass panels, if within 18 inches of the floor, shall be ¼ inch thick (or greater) wire, tempered plate or laminated safety glass.

c. Glass in playrooms and gymnasiums shall be protected by approved screening or shall be ¼" thick wire, tempered plate or laminated safety glass.

d. In music rooms where movable stair-like platforms for bands or choral groups are placed adjacent to windows, some kind of impact protection shall be provided if the window glass is ordinary glass.

e. If the stair-like platforms are built-in, then any glass less than 30 inches from the top riser must be ¼ inch thick wire or tempered plate, or laminated safety glass.

S204 PLASTICS

S204-1 General

a. Where specific standards are not set forth herein, the Model Chapter of Plastics, published by the Society of the Plastics Industry, as approved by the Commissioner of Education, shall be used as a guide.

S204-2 Definitions

a. Plastic materials are those made wholly or principally from standardized plastics listed and discussed in the current edition of "Technical Data on Plastics", published by the Manufacturing Chemists ASA, Inc.

S204-3 Classification

a. Class A plastic materials shall be those reinforced or unreinforced approved plastic materials which are self-extinguishing. (ASTM D635-56T)

b. Class B. plastic materials shall be those approved plastic materials which are reinforced with glass fiber or other non-combustible material amounting to not less than 1.5 ounces per square foot and not less than 20 percent by weight of the plastic panel or sheet.

c. Class C plastic materials shall be those approved plastic materials which are reinforced with glass fiber or other non-combustible material amounting to not less than 10 percent by weight of the plastic panel or sheet.

d. Class D plastic materials shall be those approved plastic materials other than Class A, B or C.

S204-4 Interior Finishes and Trim

a. Plastic materials for interior finish and trim shall conform to the requirements of Section S202.

S204-5 Wall Panels

a. General - a wall panel shall mean an area of one or more plastic sheets of single thickness.

b. Limitations on use:

Table S204-5b

Classification of Plastics	A or B	C or D
Building distance separation, in feet	30 or more	30 or more
Maximum area of panel of total wall area of one story	30%	15%
Maximum panel area, in square feet	300	150
Maximum panel size -		
Horizontal, in feet	100	100
Height, in feet	12	12
Minimum distance between panels -		
Horizontal, in feet	4	4
Vertical, in feet	4	8

S204-6 Glazing of Exterior Openings

a. Doors, sash and framed openings may be glazed or equipped with transparent or translucent approved plastic materials, (where such openings are not required to be fire protected) if the area so glazed shall not exceed 30 per cent of the wall area nor be more than 20 feet above grade level (unless greater areas and heights are approved).

S204-7 Skylights

a. Approved plastics may be used in skylights if the units are installed on the roof with a minimum distance of five feet (5') between them, and are installed not less than five feet (5') from any exterior wall. Over exits, shafts and stairways, only Class A plastics shall be installed as approved.

S204-8 Light Diffusing Systems in Ceilings

a. Plastic light diffusing systems in ceilings shall not be installed in required fire exits or corridors unless the assembly employs Class A plastics and is approved for such installations.

b. Plastic luminous ceilings shall not be installed in places of assembly.

c. Plastic light diffusing systems may be installed in other spaces where approved for such installations.

S204-9 Interior Partitions

a. Approved plastics may be used to provide the light transmitting mediums in partitions where plain or tempered glass is permitted, if the area of plastic so installed does not exceed in the aggregate one third (1/3) of the area of the partition in which installed.

S204-10 Exterior Veneer

a. For other plastic veneer installations, specific approval in writing is required for each application.

S204-11 Awnings and Canopies

a. Class A and B plastics may be used in awnings and canopies.

S204-12 Greenhouses

a. Approved plastics may be used in lieu of plain glass in greenhouses.

S204-13 Plastic Specialty Items

a. There are available plastic wastebaskets, pails, soap dishes and soap dispensers. Caution is urged in the purchase of these items without some guarantees from the manufacturers on the flammability and smoke propagation qualities of their equipment.

S205 FIRE RETARDANT PAINT

a. In new construction, fire retardant paint shall not be considered a satisfactory means of protecting combustible assemblies for acceptance where non-combustible materials or finishes are required.

S206 SOUND CONTROL MATERIALS

S206-1 General

a. Acoustical materials, properly used, perform an important and necessary function in school buildings. In deciding upon the type of material and technique of application, caution should be exercised in the choice so that fire safety and insurance rates are not adversely effected. Acoustic engineering service is advisable, particularly in relation to the installation in classrooms, divisible spaces, auditoriums, gymnasiums, cafeterias and music spaces.

S206-2 Acoustic Tile

a. Combustible type cellulose (wood and cane fiber) tile shall not be used except in exceptional cases where specific written approval is granted for the installation.

b. Mineral wool, glass fiber and integrally fire retardant treated cellulose fiber acoustical tiles which are certified to exhibit an all surface flame spread less than 25 when tested according to ASTM Standard E-84 are approvable.

S206-3 Non-Combustible Materials

a. Following are approved types:

1. Metal faced units and perforated asbestos board backed with acoustic pads or blankets.
2. Acoustic form board.
3. Acoustic roof deck units.
4. Unit absorbers.
5. Sprayed acoustic plaster and fiber material.

S206-4 Screens

a. Where slats or other screening (backed with sound absorbing blankets) are used, assemblies shall be designed in an approved manner to eliminate fire hazard.

S206-5 Carpeting

a. Consideration may be given to carpeting as a sound control material. Material contributing to combustion should be avoided.

S207 THERMAL INSULATION

S207-1 General

a. The various types of thermal insulating materials are an important consideration in school plant planning. Choice of material should depend on the specific problem of heat or cold to be contended with, as well as the possible effect on fire hazard and fire insurance rates.

S207-2 Table of Thermal Insulation Materials

Types	Permitted	Not Recommended	Not Permitted
a. Combustible composition board, fiber board, blankets, batts and pellets			X
b. Non-combustible composition board, blankets, batts backed with combustible paper or vapor barrier		X	
c. Non-combustible composition board, blankets, batts backed with foil or other non-combustible vapor barriers	X		
d. Non-combustible manufactured boards	X		

S208 FLOORS

a. Corridor, auditorium, gymnasium, cafeteria, kitchen, shower room, drying room, locker room and toilet room floors should be finished to minimize slipping.

PART III

VISUAL ENVIRONMENT

S301 GENERAL

a. These regulations are particularly significant in that they recognize adequate and proper artificial lighting as an acceptable source for classroom illumination. Nothing contained therein, however, should be construed as a recommendation against the use of natural lighting. (See Part VIII for artificial lighting requirements.)

S302 BRIGHTNESS DIFFERENCES

a. Visual comfort depends not only upon ample light (foot candles) but also upon reasonably low brightness difference between various surfaces within the visual field.

b. A high brightness difference or contrast between the particular object being viewed and its immediate background is desirable. Examples are: the difference in brightness between printed words and the page on which they are printed; and, the difference between the thread and the cloth on which the stitching is done.

c. On the other hand, high brightness differences within the remainder of the visual field should be limited. Examples are: book and desk; or book and walls or ceiling; or light sources viewed against adjacent surfaces.

S303 WINDOW DESIGN AND ARRANGEMENT

S303-1 General

a. To provide a comfortable feeling for the room occupants and to bring relief to their eyes through a substantial change in focusing distance, each room used by students must be designed to allow a view to the exterior (not just the sky) from any seated position anywhere in the room (See Table S303-4). This does not apply to auditoriums, gymnasiums and other facilities in which critical seeing conditions do not occur.

b. Glass areas should be placed and arranged to minimize brightness differences. Direct view of the sky or of bright exterior surfaces produces glare and should be avoided.

c. The following aids can be used to control glare:

1. Limiting clear glass window height.
2. Installing tinted glass.
3. Using extended roof overhang.
4. Installing venetian blinds.
5. Use of foliage.

d. Classroom orientation may be in any direction. East and West orientation, however, is preferred for elementary school buildings.

e. Particular care should be taken to avoid glare on surfaces below the eye level.

S303-2 Window Length

a. The principal clear glass length in a classroom should be equal to, or exceed, the given percentages of outside wall length in order to meet the following criteria:

1. If the window wall of the room is parallel to the principal axis, the glass length should be 70 percent, or more.
2. If the room is approximately square, 75 percent or more.
3. If the principal axis of the room is perpendicular to the window wall, 80 percent, or more.

b. The above percentages are the recommended percentages. The minimum accepted percentage is 50%. (See also P.A-31, Sec.165,2d)

S303-3 Window Requirements - See Table following:

a. Window stool heights for different areas are given in the table that follows. These heights, as will be noted, vary according to grade and usage. In all cases, however, the height of clear glass shall extend to at least 72 inches above the floor. Stool heights and other data are as follows:

S303-4 Separation of Window Walls

a. Distance between walls having classroom windows shall be such as to enable a substantial change in eye focusing distance. The minimum separation shall be 30 feet, however distance in excess of this is recommended.

b. Walls of non-teaching spaces, having windows (and walls with no windows) shall have a usual minimum separation of 15 feet.

TABLE S303-3

WINDOW REQUIREMENTS

Space	Max. Stool Height (Inches)	Vision Strip Reqd.	Vision Strip Recom'd.	Daylight Required	Daylight Recom'd.	Daylight Not Reqd.
Administration	--				X	X
Art & Drawing	40	X				
Audio Visual	--					X
Auditorium	--					X
Boiler Room	--				X	X
Business						
Distributive Ed.	32				X	X
Sec. & Office Prac.	32	X				
Typing	32	X				
Cafeteria	--		X	X		
Classrooms						
Academic(Secondary)	32	X				
Elementary	32*	X				
Conference	--		X		X	X
Corridors	--			X		
Guidance	--		X		X	X
Gymnasium	--			X	Skylights	
Health	--				X	X
Homemaking	40	X				
Incinerator Room	--					X
Kitchen			X		Skylights Clerestory	X
Lg. Group Instr.						X

*30 inches recommended

TABLE S303-3
CONTINUED

Space	Max. Stool Height (Inches)	Vision Strip Reqd.	Vision Strip Recom'd.	Daylight Required	Daylight Recom'd.	Daylight Not Reqd.
Library-up to 2000 sqft	44	X				
Library-over 2000 sqft	--		X		X	X
Office & Workroom	--				X	X
Conference	--				X	X
Music						
Elementary	32	X				
Junior H. S.	32		X	X		
Jr.-Sr. & Sr. H.S.	40		X	X		
Pantry, Serving	--				X	X
Pupil Activity	--				X	X
Science Rms. (All)	40	X				
Shops						
Agriculture	60	X				
Ag. Recitation	40	X				
General	60	X				
Vocational	60	X				
Shower & Locker Rm.	--			X	skylights clerestory	
Stairways, Pupil	--			X		
Store Room	--				X	X
Study Hall	32	X				
Swimming Pool	--			X	skylights clerestory	
Teachers Room	--				X	X

TABLE S303-3
CONTINUED

Space	Max. Stool Height (Inches)	Vision Strip Reqd.	Vision Strip Recom'd.	Daylight Required	Daylight Recom'd.	Daylight Not Reqd.
Television Studio	--					X
Toilets	--				X	X

Note: Exceptions to the above requirements may be granted if it can be shown, by written application, that the educational program warrants such exceptions. Where exceptions are granted, when directed, one or more fixtures in an area shall be wired so as to be continuously "on", powered from the exit light circuit.

S304 SKYLIGHTS

S304-1 Location

a. Skylights may be used to provide natural light in those spaces where a vision strip is not mandatory but natural light is required.

S304-2 Materials - See Section S204-7.

S305 CLASSROOM PROPORTIONS

S305-1 General

a. Care should be taken that each room will be properly proportioned for its intended use. In general, it is recommended that the short side of any room intended primarily for classroom or similar use be not less than two-thirds of the longer side. Since the principal clear glass windows are intended for view to the exterior, the maximum distance from the glass to the most distant point within the room should be such as to permit view to the exterior by the room occupants. Forty feet is a suggested maximum.

S305-2 Ceiling Heights

a. The ceiling heights of classrooms and similar areas measured from the floor to the principal plane of the ceiling shall not be less than nine feet.

S306 INTERIOR FINISHES

S306-1 General

a. The color and finish of walls, floors, ceilings, furniture and equipment should be designed to provide pleasing, glare-free, and stimulating environment.

b. Flat or mat surfaces provide the diffuse reflection necessary for even distribution of light. Bright, glossy surface finishes reflect light sharply and are therefore a source of glare. Such surfaces should be avoided, particularly below the eye level where the glare is extremely annoying.

c. Brightness differences (the brightness ratio) should be kept at a low figure. The brightnesses should meet the ratios as indicated in the table.

TABLE OF RECOMMENDATIONS FOR LIMITS OF BRIGHTNESS RATIOS IN SCHOOLROOMS

	RATIO
a. Between the immediately adjacent surfaces and the "Central Visual Field" (the seeing task), such as between desk top and task, with the task the brighter surface	1/3 To 1
b. Between the more remote darker surfaces in the "Surrounding Visual Field" and the "Central Visual Field" (task), such as between floor and task	1/10 To 1
c. Between the more remote brighter surfaces in the "Surrounding Visual Field" and the "Central Visual Field" (task), such as between ceiling and task	10 To 1
d. Between luminaires or windows and surfaces adjacent to them in the visual fields	20 To 1

PART IV

MECHANICAL PLANNING

S401 GENERAL

a. A school building must provide safety for children, teachers, and other occupants. No mechanical equipment or construction materials shall be used nor any type of construction permitted which will endanger the health, safety or comfort of children in school.

S402 AVAILABLE SERVICE

a. At the outset of a building program an investigation needs to be made as to the available fuels, electrical service, water supply and sewage disposal facilities which are available or for which provision will have to be made.

S403 PROTECTION

a. All underground pipes and conduits, regardless of their purpose, shall be provided with sleeves, shall be protected against corrosion and shall be sealed at the point of entry into the building with a material which will form a gas proof barrier.

S404 VALVES

a. All valves shall be labeled and tagged for quick identification.

S405 INSTRUCTIONS

a. The architect's or engineer's specifications shall provide that mechanical trade contractors or their representatives shall instruct the Board of Education or their representatives in the proper operation and service of all mechanical equipment at the time of completion and before acceptance of the school building.

S406 YEARLY INSPECTION

a. Boards of Education shall make provision for yearly inspection of all mechanical and automatic equipment and flame safeguard controls by competent personnel, to make sure that the systems operate properly.

S407 STANDARDS

a. All mechanical and electrical equipment shall meet the standards or bear the label of recognized testing agencies, such as the Underwriters Laboratories. This is especially important for all boiler and furnace burner electronic flame safeguard controls. As minimum standards the installation shall meet the requirements of the Underwriters Laboratory; however, it is much better to meet the superior standards of the Factory Insurance Association.

b. All mechanical and electrical installations shall meet the requirements of the American Standards Association and National Board of Fire Underwriters as listed in Appendix II.

S408 MECHANICAL REQUIREMENTS OF SPECIAL AREAS

a. In the early stages of design, reference to the various Department pamphlets should be made to determine special mechanical and electrical requirements in various areas, such as the audio-visual, vocational, music, science, homemaking center and art center classrooms, and in the cafeteria, kitchen and equipment drying room. In these areas special ventilation or air exhausting, special temperature controls, special temperature zoning, special plumbing fixtures, special gas and air piping, or special power provisions, might be required to achieve a satisfactory design. A list of these pamphlets with their numbers and titles is contained in the Appendix.

S409 AIR POLLUTION

a. Approval of State Health Department is required on control of air pollution. (See S612 - Page 46).

S410 AS BUILT DRAWINGS AND VALVE IDENTIFICATION

a. It is recommended that mechanical "as built" drawings be provided to the owner on burner primary controls, boiler controls, temperature and pressure controls, piping diagrams, ventilation diagrams, plumbing diagrams, electrical diagrams for power and light, fire alarm systems, exit light systems, emergency light systems and others when installations differ from the engineer's original drawings.

b. It is strongly recommended too that all piping and valves be marked and identified as to the direction of flow and type of flow within the piping for quick identification, according to ASA13.1.

PART V

HEATING, VENTILATING AND AIR CONDITIONING REQUIREMENTS

S501 PERFORMANCE STANDARDS

a. These regulations are performance standards. The Commissioner of Education has been given wide, discretionary powers in the approval of specifications for heating and ventilating. Any type of system which meets required standards will be considered for approval. However, simplicity of design and ease of maintenance should be considered so as to provide an effective system at economical cost.

S502 GENERAL

a. All heat producing equipment, accessories, and controls - and their installation - shall be such as will insure safe operation.

b. For heating systems over 400,000 BTUH input provision shall be made for all burner, boiler, and furnace controls and accessories necessary to insure safe operation. Where applicable to a particular system these shall include:

1 Automatic electronic flame safeguard controls for the burner and boiler (or furnace), or other U.L. or F.M. flame safeguard controls having a response time of 2 to 4 seconds upon flame failure. Such controls shall cause the main fuel valve to cut off within 2 to 4 seconds after flame failure.
2 Primary controls for burners and boilers or furnaces operating on a 120 volt, single phase, grounded circuit; also, in primary burner control systems, a conductor wired through the auxiliary contact of the burner motor starter to energize the main fuel valve. (High and low voltage wires must be run in separate conduits as also must be the wires to the flame-sensing safety control.)
3 Emergency break glass station at boiler room entrance arranged to disconnect the power service at the power panel and to stop the flow of fuel into the combustion chamber.
4 High limit controls - Manual reset type; high temperature for hot air or electric heat; high temperature and high pressure for boilers.
5 Air flow supervision; purging of combustion chamber; interlock of burner motor with air flow; interlock to start induced draft fan before starting forced draft fan -
6 Automatic safety shut-off control on main fuel valve; combustion air fans interlocked with safety shut-off valve, or valves -

7 Low water feeder -
8 Low water cut-off -
9 Oil preheat interlocks -
10 Low fuel pressure switch -
11 High fuel pressure switch -
12 Atomizing air or steam pressure switch -
13 Low fire start interlock -
14 Rotary burner motor or air interlock -
15 Approved burner -
16 Safe start check on burner -
17 Safety controls for proving of pilot before main fuel valve opens; for timing of pilot ignition and closing of safety shut-off pilot valve; for timing of main flame ignition -
18 A gas (normally open) vent valve, with vent to atmosphere, located between safety shut-off valves -
19 A manual shut-off valve on main fuel supply line -
20 An alarm system to signal burner failure and shutdown -
21 A positive and adequate supply of combustion air from outside through motorized dampers interlocked with burner operation, or through permanent louvers -
22 An ASME approved boiler pressure vessel -
23 ASME approved safety relief valves of adequate capacity and size for the pressure vessel -
24 Operational tests on all boilers and piping
25 Specifications which call for tests on boilers and piping.
26 Adequate space and arrangement for removal and replacement of boiler tubes.

S503 DIRECT FIRED HEATING UNITS

a. Direct fired heating units such as self-contained heaters or heating and ventilating furnaces, regardless of fuel used, shall not be installed in any building with pupil occupancy unless enclosed in at least two-hour fire rated construction. (See S504-c)

b. Roof mounted direct fired units shall be installed on concrete pads or other fire resistive construction as approved. Duct work from such units shall be protected by 1½ hour rated fire dampers, or thermal rise detectors or smoke detectors interconnected to the fire alarm system.

c. Electrical Heating - See S810.

S504 COMBUSTION AIR

a. Heater and boiler rooms shall be provided with permanent louvered openings, or with motor operated dampers interconnected with the burner operation, to insure an adequate supply of combustion air. Gravity ventilation should be provided as necessary to reduce heat build-up in the space.

b. Air handling units located in boiler rooms, shall be furnished with seals and locks on access doors to prevent toxic gases from being drawn into the units and distributed throughout the building.

c. Ductwork passing through, and openings in interior walls, floors and ceilings of boiler rooms shall be provided with 1½ hour rated fire dampers.

S505 THERMAL ENVIRONMENT DURING THE NONHEATING SEASON

a. Where extensive summer use of rooms in a school building is anticipated in any locale where summer outdoor temperatures are high, installation of air conditioning systems may be required, designed to produce the following inside temperatures:

Outside Temperature	Inside Temperature
80°	75°
90°	78°
95°	80°

b. Air conditioning systems should be considered where extensive summer use of school spaces is anticipated, as acceptable cooling cannot generally be accomplished by ventilation systems. Fresh air at a minimum rate of 10 cfm. per person is required for heating and cooling with air conditioning, (See S507-3) however consideration will be given upon request, to a reduction where air conditioning is installed. Controls and equipment shall be capable of providing 10 cfm.

S506 THERMAL ENVIRONMENT DURING THE HEATING SEASON

a. Heating systems shall be so designed and guaranteed that when properly installed and operated they will meet the following standards:

Type of Space	Design Operative (1) Temperature (Degrees F.)	Corresponding Room Air (2) Temperature (Degrees F.)
Sedentary activity, as for example in classrooms, auditoriums, offices, cafeterias	70°	68°- 72° (30" above floor)
Moderate activity, as for example in corridors, stairways, shops, laboratories, kitchens	68°	66° - 70° (60" above floor)
Vigorous activity, as for example in gymnasiums	65°	60° - 70° (60" above floor)
Special cases--lockers and shower rooms	78°	76° - 80° (60" above floor)
swimming pool area	83°	80° - 86° (60" above floor)

b. Maximum air temperature gradient from floor to 60" above floor shall not exceed 5° and preferably shall not exceed 3°.

c. Air movement in zones of occupancy shall not exceed 25 linear feet per minute.

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[1] The operative temperature represents the mean effect of the temperature of the air of a room and of its walls. Under normal conditions walls and air exert approximately equal effects; but, if a room has three cold exterior walls a higher air temperature will be necessary for comfort than in the case of a room with a single exterior wall exposed to the sun but not to the prevailing winds.

[2] The lower figure of air temperature in each case is for a room with relatively warm walls; the second figure, for a room with relatively cold walls.

S507 VENTILATING

S507-1 General

a. In classrooms, regardless of the type of activity to be carried on in the room, provisions for air change shall be made which, in the judgment of the Department, will provide a minimum air change of 10 cfm. per occupant when the outside temperature is 35°F. or above. The minimum air change may be reduced progressively to a minimum of 4 cfm. per occupant when the design temperature is -20°F.

b. Mechanical ventilation providing a minimum air change of 10 cfm. per occupant shall be provided for places of assembly, such as auditoriums, cafeterias, gymnasiums, multi-purpose rooms, etc. Additionally, sufficient ventilation should be provided to prevent overheating often experienced when large numbers of people are assembled.

c. Where there is the danger of toxic substances occurring in concentration, where odors are likely to be strong, where fumes or dust are common, or where overheating is likely to occur, special ventilating equipment adequate to relieve the situation and entirely independent of the ventilating system serving the rest of the building shall be installed.

S507-2 Classrooms

a. Under ordinary circumstances no advantage is seen in specifying air quantities in excess of the requirements of S507-1-a. The capacity of a classroom for the purposes of ventilation shall be calculated on the basis of 25 square feet of floor area per occupant regardless of activity. At 10 cfm per occupant, the minimum ventilation requirement is 0.4 cfm. per square foot of floor area (at 35°F.).

b. Classrooms may be ventilated into corridors. Ceiling spaces over corridors may serve as plenums for exhausting classrooms; however, when such spaces are used as plenums, the space plenum must be of non-combustible construction.

S507-3 Special Ventilation

a. Cafeteria-Kitchens

1. Hoods with mechanical exhaust shall be installed over steam kettles, dishwashers, ranges and other heavy-duty appliances.
2. Removable grease filters shall be provided in kitchen ductwork with adequate clearance from ends of flues or appliance vent to grease filter. Provision for cleaning should be provided.
3. Fire dampers should be provided in ducts from main kitchen exhaust hoods.
4. Cafeteria ventilation can be combined with the same exhaust system providing kitchen ventilation, however consideration must be given to the reduction of the transmission of noise between rooms.

b. Local mechanical ventilation shall be provided at benches for electric welding and also at spray paint stations.

c. Internal combustion engines shall be exhausted to the outdoors.

d. Condensing units for refrigeration and air conditioning equipment shall be located where adequate ventilation will be available for the satisfactory operation of such equipment. Such units shall not be located in storage areas which do not have ventilation.

e. Boiler Rooms. See S504

f. Toilets. S606-6

g. Recommended minimum ventilation quantities.

Table S507-2g - Air Quantities

Equipment drying room	High temperature air to insure proper drying
Locker and shower rooms	1 cfm per square foot floor area
Toilets	2 cfm per square foot floor area
Kitchens and dishwasher areas	75 cfm per square foot hood area

S507-4 Fan Motors

a. Motors operating fans and air handling systems and exhaust systems (See S809-1-d) shall be interconnected to the fire alarm system to shut down such motors when the fire alarm is activated.

S508 AIR CONDITIONING

S508-1 General

a. The heating, ventilating and air conditioning installations shall meet the requirements and recommendations of the American Society of Heating, Refrigeration and Air Conditioning Engineers.

b. Refrigeration and air conditioning installations shall meet the requirements and recommendations of the ASA Refrigeration Safety Code B9.1.

c. In buildings with specifically approved interior teaching spaces which preclude vision to the exterior, the Commissioner may require an air conditioning system to control thermal environment. (See S505 and S506)

PART VI

SANITARY FACILITIES

S601 DESIGN CRITERIA

S601-1 State Building Construction Code

a. Where specific requirements are not defined in this manual they shall be in substantial compliance with the latest edition of the State Building Construction Code applicable to plumbing.

S601-2 Accepted Standards

a. Mechanical design shall conform to commonly accepted good practice and to the generally "Accepted Standards" listed in Appendix II except as modified by this pamphlet.

S601-3 Final Authority

a. In any case of conflict between the State Building Construction Code and the "Accepted Standards" and this pamphlet, the regulations outlined in this pamphlet shall govern. Any and all final decisions concerning requirements shall be determined by the Commissioner of Education.

S602 GENERAL

a. Complete, well-arranged and well-maintained sanitary facilities are essential for comfort and convenience of the school child. The condition and sufficiency of these units affect the health and habits of the pupils. Since standards of design, finish, and materials have been constantly improving within recent years, the following recommendations seek to incorporate many of these developments proven by research and practice.

S603 SITE

a. Prior to acquiring a site for a school building Boards of Education and their Architect or Engineer should consult with the appropriate County, City or State District Health Agency in a preliminary review to determine if the prospective sites can provide adequate sanitary facilities.

b. Available water supplies for fire-fighting purposes should also be considered an important part of school site suitability. (See S608)

S604 WATER SUPPLY

a. No source of water shall be utilized without the approval of the State Health Department through their appropriate District Office or the appropriate County or City Health Department. Connection for water supply source shall be made to existing lines of nearby or neighboring water districts or municipal water systems wherever possible.

b. Water supply for schools must be adequate, safe and palatable. There shall be an abundance of water available at all times for present and future expanded needs, at least 30 gallons per pupil per day for all purposes. The water must be safe for use as determined by state or local health authorities and must be maintained safe by protection of the source of supply, by treatment, if necessary, and by frequent analysis. For drinking purposes water must be reasonably free of sulphur, magnesium or similar natural minerals which render the water unpalatable.

S605 SEWAGE DISPOSAL

a. Plans for school sewage disposal systems should be based upon reasonable future requirements as well as present needs. Sewage connections to existing or nearby sewer districts or municipal systems shall be made wherever possible. If no such system is available, an independent system must be designed including septic tanks, filter beds or leaching fields or cesspools. Plans and specifications for independent sewage disposal systems, where necessary, shall be presented to the office of the appropriate State Health Department Agency at least 60 days prior to the date of desired approval. Approval for final plans and specifications for sewage disposal must be obtained from the State Department of Health and their appropriate District Office, or the appropriate County or City Health Department. The services of the local public sanitary engineer should be sought in the early preparation of plans to the end that the plans when completed will be acceptable to the State Health Department.

b. Normally the design for school septic systems is based upon a minimum of 15 gallons per pupil of flow per day without showers and 20 gallons per pupil per day with showers.

c. Grease traps and oil interceptors should be provided in kitchen and bus garage branches. If septic tanks are used, the acid-proof drain from the science laboratories should run into a separate "dry well". Art classrooms may also require clay traps and grease traps in the waste system, depending upon the extent of the instruction program.

S606 TOILET ROOMS

S606-1 Location

a. Toilet rooms for pupils of both sexes shall be located on each floor to provide greater convenience. It is not necessary to separate widely the toilet rooms for boys and girls, but their entrances should be screened.

b. Toilet rooms for kindergarten and primary rooms should, if possible, be placed adjacent to these rooms, and open into them. For older elementary, junior high school and senior high school pupils, the toilet rooms should be located in the elementary, junior high or senior high school areas, respectively.

c. Toilets for public use should be conveniently available to the auditorium, gymnasium and other parts of the school plant commonly used by the public. School toilets, if conveniently located, will sometimes serve this purpose. Toilets for public use as well as for team use should be provided also convenient to the athletic field.

d. Where the size of the school warrants, special toilet rooms should be provided for administrators, teachers and service workers.

e. Hose bibbs and floor drains should be provided in every toilet room, with the floor pitching toward the drain.

f. Where school grounds are likely to be used on weekends, vacations and other times when the school building, itself, is closed, it is advisable to provide toilet rooms for both sexes accessible to the outdoor physical education spaces without making it necessary to open up portions of the school building. This can often be done by planning the toilet facilities for the locker and shower rooms for exterior access, and then by providing a means for closing off these spaces from the locker and shower rooms.

S606-2 Size

a. Toilet rooms for general use should have a minimum width of 9 feet to allow for economical placing of fixtures. An additional access space of 30 inches back of the principal fixtures is desirable for pipes and service.

S606-3 Materials

a. Floors should be of ceramic tile or similar impervious masonry surfaces. Finished concrete floors in toilet rooms are not recommended.

b. Walls shall be of an impervious material, such as glazed tile, or vitreous cement enamel.

c. Stall partitions shall be of impervious material, such as baked enamel finish on metal, securely anchored. In girls' toilet rooms, compartments should be provided with doors having substantial, non-corroding hardware and rubber bumbers. In boys' toilet rooms, compartment doors are optional.

S606-4 Accessories

a. No toilet room is complete without soap dispensers, toilet paper holders, waste containers, mirrors, shelves and hand drying facilities; and, sanitary napkin dispensers and waste receptacles are essential in toilet rooms for older girls. Mirrors should not be placed over lavatories.

S606-5 Illumination

a. See Table S303-3 and Table S805-1.

S606-6 Ventilation

a. Positive mechanical ventilation with separate duct system shall be provided from all toilet rooms; except that individual toilet rooms (one or two water closets, or one water closet and one urinal) located on exterior walls may have window ventilation.

S607 FIXTURES

S607-1 Water Closets and Urinals

a. Water closet bowls should be of vitreous china, should be of the extended-lip or elongated type, and should be equipped with impervious, open-front seats. The wall-hung type of water closet, while more expensive, greatly facilitates the cleaning of toilet rooms. Individual flush valves are recommended where there is sufficient water pressure.

b. Urinals should be designed to retain a deep water seal in the bowl as in the pedestal and wall-hung types. They should be so installed as to minimize sharp angles and to facilitate cleaning. Individual flush valves for flushing are recommended.

c. The following ratio of fixtures to pupils shall be considered minimum, provided that no less than two fixtures be installed in each room:

Table 607-1c

	Water Closets	Urinals
Girls (elementary)	1:35	
Boys (elementary)	1:100	1:30
Girls (secondary)	1:45	
Boys (secondary)	1:100	1:30

d. Additional facilities for special areas should be provided in excess of those determined by these ratios.

e. In the kindergarten, a water closet bowl of 13 inch rim height should be provided; for all other grades including high school, the standard size 15 inch rim height should be provided.

S607-2 Lavatories

a. Lavatories may be without a stopper. Both hot and cold water should be provided, either from a combination type faucet or from individual faucets. Positive temperature control should insure that the hot water will be tepid, not scalding!

b. Wash basins shall be provided for toilet rooms in the ratio of one fixture to 50 pupils, and shall be placed so that the pupils will pass them as they leave the room. Installation should be a minimum of 25 inches from the floor for elementary grades and a minimum of 30 inches for high schools. Study should also be given to the use of group washing facilities near the entrance of the cafeteria.

S607-3 Shower Heads

a. Shower heads should be located at least 4 feet apart and not more than 6 feet above the floor for senior high schools. Junior high school shower heads should be between 54 and 56 inches from the floor. Vandal proof heads are usually less trouble. Recommended valve height is 45 inches.

S607-4 Service Sinks

a. In the custodian's closet on each floor and in the custodian's service room, a service sink shall be provided. The sink should be placed low for convenience and have a chip-proof rim. Consideration should be given to the floor-recessed type of mop and service sink which has a rim approximately 8 inches above the floor. Faucets should be installed high enough above slop sinks to permit filling of water buckets. Service sinks should have a three-quarter inch flow of hot and cold water available.

S607-5 Drinking Fountains

a. Drinking fountains should be of an impervious material, of a type that will not permit the mouth of the pupil to come in contact with the nozzle, or permit the water to fall back upon the nozzle. The fountain jets and all openings in the water supply piping should issue above the level of the fountain bowl rim.

b. Provide fountains at a ratio of one fountain to 150 pupils, with a minimum of one drinking fountain on each floor having pupil occupancy.

c. Recommended height to nozzles: kindergarten and primary, 24 inches; upper elementary and high school, 32 inches.

d. Fountains shall not be attached to lavatories or sinks and shall not be located in toilet rooms. They should be located convenient to primary rooms, gymnasiums, playgrounds and shops. It is not good practice to locate gymnasium drinking fountains and cuspidors within the gymnasium playing area. Water spilled on wood floors creates an unsightly, slippery, and hazardous condition and causes difficult maintenance problems. A better location is in adjacent alcoves or passage areas off the main floor. Where construction permits, fountains should be recessed full depth.

e. Drinking fountains may be installed in conjunction with classroom sinks in the following manner: A shallow receptor for the fountain, having a minimum edge clearance from the sink of 6", may be installed in the counter top with its drain draining into the sink drain.

f. Drinking fountains of the frostproof type should be located convenient to the playground area.

S607-6 Floor Drains

a. In the shower and drying rooms sufficient floor drains should be provided and located so that no pupil needs to stand in or walk through waste water. Curbs with their attendent hazards can often be eliminated by judicious location of drains.

b. Automotive shops require floor drains in the center of an area approximately 14 x 14 feet in front of the overhead door. The floor in this area should slope to the drain, and an oil interceptor should be provided.

c. Cafeteria-kitchen floors should have drains where there is spillage or frequent hosing and cleaning is required. Floors under and around steamers and kettles should be drained independently of other floor areas.

S607-7 Outside Hose Fixtures

a. These should be provided at least every 100 feet around the perimeter of the building. Frostproof hydrants elsewhere on the school grounds are highly desirable.

S608 FIRE HYDRANTS

a. Where a municipal water system is available, standard fire hydrant facilities shall be installed at locations which will allow a 600 foot length (maximum) of fire hose to come within effective quenching range of any fire.

b. To obtain better rating benefits from fire insurance rating organizations, a water flow of at least 500 G.P.M. should be provided by the municipal system. Actually, flows on the order of 2000 G.P.M. for most schools are necessary before the protection is deemed really good.

S609 PIPING

a. Long range economy usually justifies the use of noncorrosive pipe, selected not only for immediate demands but also with a view to possible expansion of the building and its services. Valves and fittings should also be selected with a view to ease of service and replacement. All valves should be tagged for identification and a chart of the piping layout should be readily accessible in the custodian's room. Draining and venting should be in accordance with commonly accepted standards of public work.

S610 SWIMMING POOLS

a. Mechanical equipment plans and layouts for swimming pools, together with their specifications, shall be presented to the appropriate State Health Department Agency at least 60 days prior to the date of the approval desired from the Division of Educational Facilities Planning. Final plans and specifications for school buildings which include swimming pools shall not receive the approval of the Commissioner of Education until approval is granted by the State Department of Health.

S611 SPECIAL REQUIREMENTS

a. In the cafeteria kitchen a good installation will provide pre-rinse hot water at 110°F, wash tank hot water at 140°- 160°F, and final rinse hot water (if no chemical sanitizer is used) at 180°F. Dynamic pressure should be a minimum of 20-25 psi.

b. In art classrooms hot and cold water to sinks (with clay and grease traps) is usually required.

c. In vocational agriculture a milk testing sink is usually included. This same sink, which should be acid-proof with an acid-proof trap and waste, can also be used as a wash sink by the students.

d. Domestic hot water heaters having a capacity of 400,000 BTU's per hour input or more must be provided with electronic flame safeguard controls in accordance with S502.

S612 AIR POLLUTION

a. Heating plants of one million BTU's rated input capacity, or more, and any kind of incinerator installation or other kind of installation capable of polluting the atmosphere (such as a spray booth, etc.) must have the approval of the State Health Department before final approval by the Commissioner of Education can be given. (See Appendix A-41 for complete details.)

PART VII

GAS FACILITIES

S701 GENERAL

a. Gas curb cocks to shut off the supply of gas shall be installed and located for ready accessibility in case of emergency.

b. All gas equipment shall comply with ASA Listing or Approval Requirements where applicable and shall bear the listing or approval label of a recognized testing agency such as the American Gas Association Laboratories, Inc. or Underwriters' Laboratories, Inc. Installation of gas equipment and piping shall be in accord with the applicable American Standards installation requirements.

c. All gas appliances shall be provided with suitable pressure regulation either by approved individual regulators, or by an approved regulator controlling a group of appliances within a space.

d. Low pressure gas pipes shall not be laid in unvented spaces under buildings unless there is no other reasonable location available. In such cases the gas pipe shall be encased in a gas tight casing which shall be vented to the atmosphere. Gas pipes shall not be run in or through heating ducts. Details of installation of piping are given in ASA221.30, latest edition and in the American Standard B31.8 latest edition.

e. The gas piping system shall withstand a pressure test of at least 30 inches of mercury or 15 pounds per square inch gauge for a period of not less than one hour without showing a drop in pressure. Pressure shall be measured with a mercury manometer or slope gauge or an equivalent device so calibrated as to be read in increments not greater than 0.1 pound per square inch. The source of pressure shall be isolated before the pressure tests are made. Tests shall be made in the presence of the architect or engineer or his representative. Dead weight testers, mercury manometers, pneumatometers or spring test gauges are accurate devices whose use is recommended.

f. Utility gas admitted into school buildings shall also be adequately odorized to render it detectable as prescribed by the Public Service Commission. Liquefied petroleum gases shall be odorized as prescribed by NFPA Standard No. 58.

g. Whenever liquefied petroleum is used, special pipe joint compound resistant to liquefied petroleum gas shall be used.

h. A master gas valve for the science areas shall be provided in an accessible place when there are three or more outlets in the place of pupil occupancy.

j. High pressure gas lines must be located safe distances from a school building and must be installed according to special construction requirements of the Public Service Commission.

S702 LOW PRESSURE GAS

a. When boilers of less than 400 H.P. are used, the maximum pressure of gas admitted into school buildings shall not exceed one-half pound per square inch gauge. When boilers of 400 H.P. and larger are required, and, when certain types of conversion or package jobs are used, it may be desirable to use gas at pressures over one-half pound per square inch. In such instances application shall be made to the Division of Educational Facilities Planning for specific permission to use higher pressure, stating the reasons for it and the pressures required. (Whenever gas service is authorized at a pressure in excess of one-half (½) pound per square inch gauge for the boilers, the system shall be equipped with a pressure regulating device and a relief valve or a complete shutoff device which will prevent accidental overpressuring of the low pressure system serving other areas.

b. Pressure regulating and overpressure protection devices located outside the school building shall be enclosed in a cabinet, gas house, cubicle, areaway, vault, or pit made of durable structural materials which will withstand any loads to which they may be subjected. When pressure regulating and overpressure protection devices are located within the building walls in a separate room (as is sometimes allowed) there shall be no place of pupil occupancy above, or contiguous to, the gas regulating equipment room; and, construction of this room shall be of two hour fire resistant, reinforced concrete construction throughout (walls, ceiling and floor). This area shall be accessible only through an outside opening, shall be well ventilated, and shall have adequate space and protection from falling objects for both equipment and piping.

c. The gas service pressure regulators and overpressure relief valves shall also be suitably vented into the outside atmosphere at sufficient height to prevent hazardous conditions to children and the surrounding area.

S703 AREAS OF USE

a. Science classrooms - gas outlets at fixed spacing (usually 5 feet) at work counters.

b. Homemaking classrooms - outlets to gas burner type kitchen equipment.

c. Art classrooms - gas outlets at work counters (usually every 30 inches).

d. Gas fired kilns - whenever used a master control valve shall be provided.

e. Kitchens - as required by equipment.

f. Soldering and annealing - with compressed air if a compressed air torch is to be used.

g. A master control valve for the instructor's control shall be provided in any space having 3, or more, gas outlets. This valve may be either a manual or an electrically operated solenoid valve.

PART VIII

ELECTRICAL

S801 GENERAL

a. All electrical work shall conform to the requirements of the National Electrical Code, NBFU Pamphlet No. 70.

b. All electric devices and materials shall meet the requirements of Underwriters Laboratories, and shall bear their label.

c. Elevators, dumbwaiters and escalators shall be designed, constructed and installed according to the American Standard Safety Code A17.1, Latest Edition. Consideration should be given to the installation of elevator equipment for the physically handicapped in school buildings they will attend. Residential type elevators may be provided for use of the physically handicapped and their attendants.

d. Transformer vault rooms and equipment therein shall conform to the requirements of the National Electrical Code and provision shall be made for adequate ventilation. Outdoor transformers on concrete pads are permitted if totally encased. Installations shall conform to the National Electrical Code.

S802 TESTS

a. Tests of electrical work shall be made as equipment is installed and shall include a run under full load (or a reasonable overload) long enough to determine that no excessive heat will be developed at terminal points, switches, and other points of installation.

S803 AREAS OF SPECIAL ELECTRICAL NEEDS

a. Homemaking - 220 volt service to electric ranges, ovens, and clothes dryers -

b. Science - 110 volt outlets at frequent intervals over work counters and at work stations. (Incorporation of outlets in laboratory cabinets is a common practice.) -

c. Commercial areas - Floor outlets for electrically operated office equipment.

d. Art - 110 volt outlets at 8 to 10 feet over work counters -

e. Electric kilns - usually on a separate 220 volt circuit.

f. Shops - 220 volt, 3 phase power is more efficient for electric motors of ½ horsepower up. Welding usually requires 220 volt, 1 phase power -

g. Kitchen - as required by equipment. 220 volt, 3 phase power is usually provided.

h. Stages - as required by the program.

i. Audio visual - 110 volts, 1 phase, 20 ampere circuits for machines of 1200-1500 watts.

j. Electric outlet locations should anticipate fixed and portable equipment; also, heights of work counters and back splashers.

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S803-2 Hazardous Areas

a. Areas such as finishing rooms containing paint spray equipment shall have explosion-proof motors, non-arcing switches and explosion-proof outlets and fixtures.

S803-3 Industrial Art Rooms

a. Lighting fixtures for industrial art rooms shall be of a type in which the maximum surface temperature of the lamp or tube does not rise above 165°C. Shielding of the lamps from accidental blows must also be provided.

b. Woodworking machine tools shall be provided with dust-tight plugs and receptacles, or shall be provided with a rigid to flexible permanent connection. Dust-tight motor starters are to be provided on such equipment.

c. Shaving or dust collecting devices shall be inherent within woodworking machine tools or else some vacuum collecting device shall be attached for the gathering of shavings and dust particles.

d. Motors attached to woodworking machine tools shall be the self-enclosed type.

e. Shop emergency switches on each wall are required around the perimeter of the industrial art room to de-energize the power panel in emergencies.

S804 LOCKING DEVICES

a. Lighting and power panels shall be provided with locking devices and index cards showing circuits controlled by each breaker or switch.

S805 ARTIFICIAL LIGHTING

S805-1 General

a. School buildings shall be provided with sufficient and suitable artificial light to conduct the school activities in the absence of natural light. American Standards Association A23.1 should be applied in determining the recommended lighting intensities. The minimum acceptable standard of requirements is as follows:

Table S805-1

Minimum Foot Candle Requirements

Location	Minimum Maintained Foot-Candles	Initial Foot-Candles
Classrooms, study halls, lecture rooms, libraries -- on desks, tables, chalk and display boards	30	40
Office--on desks	30	40
Sewing rooms, music rooms, drafting rooms, art rooms, and other rooms where fine detail work is to be done--on the work	40	53
Shops, laboratories--on the work	30	40
Gymnasiums, playrooms, swimming pools	20	27
Cafeterias and other similar places if used for study	20	27
Auditoriums	10	13
Corridors, stairs, passageways and all indoor areas traversed by students	10	13
Locker rooms and toilets	10	13
Sightsaving classrooms-on desks, chalk and display boards	50	67

S805-2 BRIGHTNESS DIFFERENCES

See S-302.

S806 EMERGENCY LIGHTING

a. An automatic emergency lighting system (not necessarily including a generating plant) is required for the exits and exitways from any place of assembly exceeding 1800 square feet and for all building exits. These areas are as follows:

Auditoriums
All Purpose Rooms
Cafeterias
Gymnasiums
Large Group Instruction Rooms
Other combined Places of Assembly
Playrooms
Swimming Pools

S807 EXIT LIGHTS

a. Red and white exit lights shall be provided in auditoriums, assembly halls, gymnasiums, stairways, corridors and exits with illuminated signs showing the word "EXIT" in plainly legible letters not less than four and one-half inches high and with the strokes of each letter not less than three-fourths of an inch in width.

b. Exit signs circuiting shall be on a separate and segregated circuit wired to minimize the possibility of interruption.

S808 AUDITORIUM AISLE LIGHTING

a. To provide for proper safety when the auditorium is in darkness, it is recommended that aisle lights be installed on the side of the aisle seats at every third row on the main floor and every two rows in the balcony.

S809 FIRE ALARMS

S809-1 Requirements

a. Supervised (trouble bell-trouble light) fire alarm systems are required for all schools of two classrooms or more. They shall be designed to permit operation from convenient locations in corridors and also from areas having unusual fire hazards, such as shops (if over 1,000 square feet, one station for each 2,000 square feet or fraction thereof), cafeteria-kitchens, and boiler or heater rooms, with a practice switch or operation control located convenient to the office for use in fire drills. In these areas fire alarm stations shall be located near exit doors. No point in the corridor shall be more than 100 feet from a fire alarm station. Either manual and/or electric control is acceptable depending upon the size of the building if the signals are designed to give positive warning to all points of the building, regardless of other noises and activities.

b. The use of strident or panic-producing signals shall be avoided in auditoriums or other areas where panic might occur.

c. Fire alarm stations and gongs shall be on circuits separated and segregated from other circuits, wired to minimize the possibility of interruption and may be on the same panel with the exit light system.

d. The fire alarm system shall also be interconnected to disconnect motors operating fans and air handling systems and exhaust systems having a capacity greater than 1000 CFM. (Individual room unit ventilators are not required to be interconnected.)

e. Any school located in a municipal fire district having a general fire alarm system shall be provided with a fire alarm box on the premises which shall be interlocked with the school system.

f. The typical alarm box used in the city, village, town or fire district is to be located on the premises as directed by a responsible authority in the fire department.

g. The trouble bell of a "Fail-Safe" alarm system shall be located in the main office.

S809-2 Thermal Detection Stations

a. Automatic thermal detectors are recommended for inclusion with fire alarm stations. It is recommended that fixed temperature detectors be provided for kitchens, boiler rooms, homemaking, shops, paint spray rooms and other areas which are hazardous and might experience a high rate of temperature rise in a short period of time. It is also recommended that rate-of-rise detectors be provided in storage rooms, janitor closets, main stages, attics, fan rooms and other areas which are hazardous but would not experience a high rate of temperature rise in a short period of time. Generally, fixed temperature detectors are preferred, unless holding circuits are provided in the enunciator to hold in the detector which has been energized and thereby prevent cycling.

S809-3 Smoke Detection Systems

a. Smoke detecting systems are recommended for those areas, or plenums, having unusual chimney effects for smoke and fire, such as stairwells and warm air heating and ventilation systems. These separate smoke detection systems may be interconnected at the fire alarm panel to automatically sound the internal fire alarm system as well as the municipal fire alarm system.

b. Magnetic door holders normally holding doors in the open position may be interlocked with the smoke detection (or thermal detection) system so that, upon the sounding of an alarm, the magnetic door holders will automatically allow the doors to close.

S810 ELECTRIC HEATING

S810-1 Requirements

a. Electrical Space-Heating Equipment for school buildings must meet the general construction and performance requirements of Underwriters Laboratories, Inc., Pamphlet 573 for Air-Heating Appliances, for Duct Heaters and for Central Heating Furnaces, as well as the specific construction and performance requirements of this pamphlet. Attention is directed to the specific construction requirements for Guarding of Heating Elements and the performance requirements for Temperature and Abnormal Operation for Air-Heating Appliances. Attention is also directed to the specific construction requirements for Limit Controls and the performance requirements for Temperature for Test Enclosures, for Normal Tests and for Abnormal Tests for Duct Heaters. Also, attention is directed to the construction requirements for Enclosures and Limit Controls and the performance requirements for Temperature Tests for Central Heating Furnaces.

b. All such electrical heating equipment shall be listed in the Underwriters Electrical Applicance and Utilization Equipment List for installation in ordinary locations in accordance with the National Electrical Code. Electrical space heating equipment intended for use in hazardous locations must meet the construction requirements of the Underwriters Laboratories, Inc. and must be listed by the Underwriters for such intended use. Open-coil resistance heating elements are further required to be installed in heater rooms whose walls, floors, ceilings and doors must have a fire resistivity of two hours or more.

c. School building temperature controls incorporated with the above Electrical Space-Heating Equipment must operate such equipment safely and must limit air discharge temperatures prescribed by the latest American Society of Heating, Refrigerating and Air Conditioning Guide.

S811 TELEPHONE

a. A public telephone shall be provided in all school buildings having pupil occupancy.

PART IX

EXISTING BUILDINGS

S901 GENERAL

a. Pursuant to the provisions of Section 409 of the Education law, in order to insure the health and safety of pupils in relation to heating, lighting, ventilation, sanitation and health, and fire and accident protection, all school buildings of school districts other than city school districts of cities having 125,000 inhabitants or more shall meet the following requirements, unless exceptions are granted in writing:

b. Existing buildings are classified as Class "A", "B" or "C" construction as defined by the Local Finance Law. See Appendix IIIA.4 and "construction classification", pg. A.2 of Glossary.

S902 CORRIDORS

a. Corridors and passageways shall be kept clear and free of obstructions at all times.

b. Corridor pockets (deadend conditions) shall be restricted to a depth of 1½ times the width of the pocket or to 1½ times the width of the corridor, whichever is less. Doors within such pockets must be at least 15 feet from the top riser of a stairwell. See Section 907-1.a.

S903 EXITS

S903-1 General

a. There shall be at least two means of egress remote from each other leading from each floor of pupil occupancy for all school buildings, so that when a pupil enters into a corridor from a room of pupil occupancy, he shall have a choice of two unobstructed means of egress in different directions. See EXIT, Appendix 1, Glossary & Definitions.

b. Fixed and movable gates shall not be located so that they create deadend conditions for occupied spaces when gates are in use. Such gates shall not be used during school hours.

c. Exiting through adjacent spaces within a building, other than corridors, will not be allowed unless specifically approved.

d. See Section 903-3 for Escape Window Requirements.

e. Folding and rolling partitions and sliding or overhead doors are not considered as exits.

S903-2 SPACES OF PUPIL OCCUPANCY

a. Every space of pupil occupancy over 500 square feet (not including places of assembly) shall have two separate means of exit from the space, in addition to the requirements of Section 903-1 a. The primary exit shall be an exit door opening to a corridor or a door leading directly to the outside. The second exit may be a door opening to a separate corridor which does not intersect the primary exit corridor, a door directly to the outside, a window of such size and design as to permit egress to the outside, or a door providing egress through adjacent spaces, where specifically approved.

b. Rooms under 1500 square feet: Where distance of travel from any point in the room exceeds 50 feet to an exit door, a second door remote from the other shall be provided.

c. Rooms over 1500 square feet shall have two exit doors remote from each other. A pass door in an overhead garage type door can be counted as a second exit.

d. In large classrooms divided into two or more separate areas by means of movable partitions, each divided area shall have its own exits which shall be remote from each other.

e. See Section 903-3, Escape Windows.

Note: See Appendix 1, page A.2 for definitions of building classifications.

S903-3 ESCAPE WINDOWS

a. Emergency escape windows as required in Section 903-2 shall be a designated window of such size and design as to permit and facilitate emergency egress through it. Such windows shall be free of obstructing screens or storm sash.

b. The minimum clear opening area for such windows shall be six square feet. The minimum dimension shall be 24 inches.

c. Double hung, casement and sliding windows are generally satisfactory types of escape windows.

S903-4 PLACES OF ASSEMBLY

a. Maximum occupancy for existing places of assembly (re: S104-2) shall be based on the number and size of existing approvable exits, on the basis of 50 persons for each 11 inches of clear exit width (½ exit unit). See Table 104-2d.

b. In appropriate instances, as directed by the Commissioner, signs restricting the number of occupants shall be conspicuously posted at each exit location.

Signs shall read (in red letters on white background):

MAXIMUM OCCUPANCY	line 1
Not to Exceed	line 2
________ PERSONS	line 3

Lines 1 and 3 shall be letters not less than 4½ inches high and strokes not less than 3/4 inches wide.

S903-5 COURTS

a. Courts which have their perimeters completely enclosed are considered potential areas of pupil occupancy.

b. Courts of less than 3,000 square feet but more than 700 square feet area shall have at least two exits, remote from each other, equipped with classroom function hardware operable from the court, and with doors swinging in direction of egress.

c. Courts of more than 3,000 square feet area shall be exited on the basis of one person per 20 square feet area, (one exit unit per 2,000 square feet) with a usual maximum of six exit units required. Exits shall be remote from each other, equipped with panic hardware operable from the court, and with doors swinging in the direction of egress.

d. Where security is a problem, it is suggested that installation of an automatic alarm system be considered.

S903-6 EXIT SIGNS

a. School buildings of from one to six classrooms shall be provided with exit signs showing the word "EXIT" in legible letters not less than 4½ inches high and strokes not less than 3/4 inches wide.

b. See Exit Lights, Section S913-3.

S904 HARDWARE

S904-1 Classroom Doors

a. All classroom door hardware and hardware on doors of spaces of pupil occupancy shall be a type which will always permit the door to be opened from the inside without the direct manipulation of any type of locking device.

S904-2 Panic Hardware

a. All exterior and interior exit doors from all places of assembly exceeding 1800 square feet shall have panic hardware except that panic hardware is not required for push-pull interior doors from places of assembly and vestibules if these doors have non-locking hardware.

b. All exterior corridor doors shall have panic hardware except those serving less than three classrooms or service areas (such as a boiler room, kitchen or storage room).

c. Hardware on exit doors not requiring panic hardware shall be as Section 904-1.

d. Exit doors shall not be locked or chained or otherwise rendered inoperable from the inside at any time.

S905 FIRE DOORS

a. The following requirements for fire doors pertain only to interior doors leading from spaces mentioned.

b. In Class "A" Construction:

1. "B" Label construction self-closing doors are required on:

   Boiler or heater rooms
   Mechanical equipment rooms
   Basement storage rooms and flammable liquid storage
   Incinerator rooms
   Transformer vaults
   Openings from basements and other lower level areas to ground or first floor (See S907-1-d).

2. "C" Label construction doors are required on projection booths and stair enclosures.

S906 STAIRWAYS

S906-1 General

a. There shall be at least two means of egress remote from each other from each floor having pupil occupancy, including basements.

b. There shall be no storage under any stairs or landings.

S906-2 Handrails and Rails

a. Continuous handrails shall be provided on at least one side of stairways. For stairways 88 inches (or more) wide, one (or more) center handrail is recommended.

S906-2 b. Height of handrails above and in line with risers should be 2'-2" to 2'-8", depending upon the age of the pupils.

c. Balustrades for both interior and exterior stairs shall be provided. 3'-6" above and in line with risers and 3'-9" above the finished floor of their platforms is the usual height.

S906-3 Fire Escapes

a. Fire escapes of approved design shall be installed where other exits are determined to be inadequate for fire safety (see Appendix IV c).

S907 SMOKE AND FIRE CONTROL

S907-1 General

a. Spaces of pupil occupancy in Class "A" buildings that are beyond stairs and do not have two optional directions of travel at the classroom door may have a door at least 15 feet and not more than 20 feet beyond the top riser of a stairway, providing the following conditions are met:

1. The corridor pocket is in accord with Section 902-b, OR
2. Each space of pupil occupancy beyond the stairs shall be provided with direct exit to the outside, OR
3. The building is provided with automatic sprinkler system of approved design or an automatic smoke and fire detection system of approved design, OR
4. The stairways of the building shall be provided with enclosures to control the spread of smoke and fire, AND
5. In appropriate instances, alternate means of egress through approved adjacent spaces may be required.

b. In Class "B" and Class "C" buildings of two stories or more, stairways shall be provided with enclosures to control spread of smoke and fire, OR each space of pupil occupancy shall be provided with direct exit to the outside. In appropriate instances, alternate means of egress through approved adjacent spaces may be required.

c. Class "B" and Class "C" buildings shall not have places of assembly above the first floor, except where it is determined that adequate exits are provided in a Class "B" building, a written exception may then be granted.

d. In appropriate instances doors, walls and ceilings of exitways (corridors, stairs, vestibules, etc.) may be required to be finished with fire-retardant materials or coatings.

e. Floor levels below the first or principal floor levels should be closed off from the levels above by enclosures to control the spread of smoke and fire (see S907-1-a and b).

f. Wood floors shall not be treated or finished with oil. Floors previously so finished shall be cleaned and refinished with a penetrating seal.

g. In appropriate instances, stairway exit enclosures, in addition to those required above, may be required.

A907-2 Stairway Enclosures

a. Stairway enclosures, where required, shall be constructed of materials and doors, of such design as to close off each floor to control the spread of smoke and fire.

1. Stairway enclosure doors shall be designed to be kept normally closed and shall not be secured in an open position. Doors shall bear signs reading "Fire Door - Keep Closed" in letters not less than 3" high.

2. Stairway enclosure doors may be held open if an automatic release device is provided and so arranged that detection of smoke and/or fire, and/or setting off the building alarm system will cause an interruption so that the doors will be released and will close.

b. Enclosures closing off floor levels below first or principal floor levels shall be of non-combustible construction.

S907-3 Fire Extinguishers

a. Fire extinguishers shall bear the Underwriters Label and shall be at locations such that no point in a corridor, lobby or stairs shall be more than 100 feet from an extinguisher.

b. Extinguishers shall also be placed convenient to the stage of the auditorium, in shops, cafeteria-kitchens, boiler rooms, chemistry laboratories, incinerator rooms and in other places which can be considered potential sources of fire.

S907-4 Miscellaneous Spaces

a. Boiler or heater rooms, fuel rooms, transformer vaults, incinerator rooms and similar spaces shall have walls, doors, floors and ceilings of at least two hour fire-rated construction in Class "A" construction, or of at least one hour fire-rated construction in Class "B" and "C" construction, except those spaces having roof construction over the entire area may have the ceiling/roof of fire-resistive construction.

b. Walls and ceilings of basement storage rooms shall be at least one hour fire-rated construction. Combustible attic spaces shall not be used for storage.

c. All areas for the storage of gasoline-powered equipment and/or flammable liquids shall be separated from the rest of the school building by at least one hour fire-rated construction and self-closing "B" Label doors with no hold-open devices.

NOTE: One hour fire-rated construction may be obtained generally by using 2 x 4 wood studs, 16" on center, fire-stopped; finished each side with one layer of 5/8" Underwriter's Laboratories rated gypsum board with nails at 6" spaces and with 1 1/8" penetration. Underwriter's rated Class "B" doors are necessary for this rating.

NOTE: Two hour fire-rated construction may be obtained generally by two layers each side of 5/8" Underwriter's Laboratories rated gypsum board with construction as above. Underwriter's rated Class "B" doors are necessary for this rating.

d. Auditoriums and stages: all curtains, fittings and draperies shall be fireproofed at regular intervals so as to assure fire safety. Finishes of all surfaces on stage shall be fire resistive.

S908 HAZARDOUS GLASS AREAS

a. In exterior exit doors and vestibule doors, main interior exit doors and in adjoining sidelights or glass panels, if the glass panel extends within 48 inches of the floor, it shall be of a minimum of one quarter inch thick wire, tempered plate or laminated safety glass.

b. Glass panels, if within 18 inches of the floor, shall be a minimum of one quarter inch thick wire, tempered plate or laminated safety glass.

S909 MECHANICAL STANDARDS

a. All mechanical and electrical equipment should meet the standards and bear the label of recognized testing agencies, such as the Underwriter's Laboratories. This is especially important for all boiler, burner and automatic combustion flame safeguard controls. All pressure vessels shall be constructed according to A.S.M.E. Standards.

b. All mechanical and electrical installations should meet the requirements of the American Standards Association and National Board of Fire Underwriters as listed in the Appendix II.

S910 HEATING AND VENTILATING

S910-1 General

a. All heat producing equipment shall be such as to insure safe operation.

b. All primary controls for boilers and burners shall operate on a 120 volt, single phase, grounded circuit. These controls will normally include the hold-in coil of the motor starter, the solenoid coil for the pilot valve, the solenoid coil for the main fuel valve or the actuator for the motorized fuel valve, the ignition transformer and the modulator transformer. Electronic flame safeguard controls shall normally respo[redacted]-4 seconds to cut off the fuel through the main fuel burner valve.

c. It is highly recommended that the following be accomplished, if not already inherent in the burner installation:

1. Wire the conductor in the primary control which energizes the main fuel valve through the auxiliary contact of the burner motor starter (providing the auxiliary contact is available).
2. Provide for guaranteed low fire start if system has modulation.
3. Provide a high pressure limit for steam systems and a high temperature limit for hot water. Manual reset types are preferable. (The operating control which calls for heat is not a limit switch.)
4. Provide manual reset low water cutoffs for steam and hot water boilers.
5. Provide for purging of the combustion chamber where primary, forced or induced draft fans are present.
6. Provide a constant, positive supply of clean combustion air for burners. Provide ventilation where temperature in boiler room is excessive.
7. High voltage and low voltage wires shall not be run in the same conduit.
8. Wires to flame sensing devices should be run in a conduit carrying only these wires.

S910-2 Direct Fired Heating Units

a. Direct fired fuel burning heating units, such as self-contained heaters or heating and ventilating furnaces, shall not be installed in any classroom or space of pupil occupancy.

S910-3 **Unused Duct Work**

a. Unused duct work shall be sealed off at each floor level with incombustible material.

S911 SANITARY FACILITIES

a. Every school building shall be provided with a supply of safe, potable water for drinking purposes dispensed through approved sanitary drinking fountains.

b. Every school building shall be provided with separate toilet rooms for boys and girls, with flush toilets and wash basins connected to an adequate water supply under pressure and a sewage disposal system, if a public sewer is not available.

c. No source of water supply nor sewage disposal system shall be used without the approval of the State Department of Health.

S912 GAS

a. Gas entering a school building shall be at ½" psig (pressure) or less.

b. Gas within school buildings should comply with Part VII "Gas Facilities" of this Manual.

S913 ELECTRICAL

S913-1 **General**

a. Electrical work shall conform to the requirements of the National Electrical Code, NBFU Pamphlet No. 70.

b. Electric devices and materials shall meet the requirements of Underwriter's Laboratories.

c. School buildings shall be provided with sufficient and suitable artificial light to conduct the school activities in the absence of natural light (see Table S805-1 for recommendations).

S913-2 **Emergency Lighting**

a. An automatic emergency lighting system is required for any place of assembly exceeding an area of 1,800 square feet and for all exits leading from such areas. Usual areas are as follows:

Auditoriums
All-Purpose Rooms
Cafeterias
Gymnasiums
Large Group Instruction Rooms
Other Combined Places of Assembly
Playrooms
Swimming Pools

S913-3 Exit Lights

a. For school buildings of over seven classrooms, exit lights shall be provided in auditoriums, assembly halls, gymnasiums, stairways, corridors and exits with illuminated signs showing the word "EXIT" in plainly legible letters not less than four and one-half inches high and with the strokes of each letter not less than three-quarters of an inch in width.

b. Exit sign circuiting shall be on a separate and segregated circuit wired to minimize the possibility of interruption.

c. See Exit Signs, Section 903-6.

S913-4 Fire Alarms

a. One-story school buildings of one to six classrooms shall be equipped with a manually operated fire alarm (which may be electric and may include automatic smoke and/or fire detection) capable of being sounded for such a period of time as to insure the evacuation of all occupants of the building.

b. School buildings of seven classrooms or more, or multi-storied buildings, shall be equipped with a manually operated electric fire alarm (which may include automatic smoke and/or fire detection) which will continue to sound the alarm until the tripped station has been restored to normal operation, or has completed a cycle of not less than 30 seconds.

c. Every school building in any city, village, town or fire district having a general fire alarm station and an electrically operated fire alarm system, shall be equipped with a municipal fire alarm box (located on the site or on the school building) of the same type and character used in such city, village, town or fire district. Wherever practical, the internal fire alarm system of a school building shall be connected with the general fire alarm system so that the setting off of the school internal fire alarm system automatically gives the alarm to the fire department affording protection to the school.

S913-5 Telephone

a. All buildings having pupil occupancy shall be equipped with a telephone which can be used in an emergency.

APPENDIX I

GLOSSARY AND DEFINITIONS

addition - Extension or increase in area or height of a building.

alteration - Any change, rearrangement, or addition to a building, other than repairs; any modification in construction, or in building equipment.

approved - Approved by the Commissioner of Education or by an authority designated by the Commissioner.

assembly space - A room or space over 1800 square feet (exclusive of platform or stage) which is used for pupil occupancy. This includes auditoriums, stages, cafeterias, gymnasiums, natatoriums (those with spectator space), courts, little theatres, music rooms, and large group instruction rooms.

attic - Space between the top of the uppermost floor construction and the underside of the roof.

automatic - A process or action which does not depend upon manual operation but is accomplished by power furnished by a mechanical, electrical, or hydraulic source (or any combination of these).

automatic door - Door with closer.

basement - That space in a building which is partly below grade and has more than half its height (measured from floor to ceiling) above the average established curb level, or finished grade, of the ground adjoining the building.

building line - Line established by law, ordinance, or regulation, beyond which no part of a building (other than parts expressly permitted) shall extend.

cellar - That space in a building which is partly or entirely below grade and has more than half its height (measured from floor to ceiling) below the average established curb level, or finished grade, of the ground adjoining the building.

combustible - A material or combination of materials which will ignite and support combustion when heated at any temperature up to 1382°F. (750°C.)

Commissioner - The Commissioner of Education

construction classification - A classification of buildings into types of construction based on the fire resistance of walls, floors, roof and other structural members.
Class A, B, and C are as defined by the Local Finance Law (Article 2, Section 11, Paragraphs 11, 12 and 13). It should be emphasized that the term "fireproof" is peculiar to this particular law and is applicable to both Class A-Type 1, fire-resistive construction, and Class A-Type 2, noncombustible construction.

Class A-Type 1, fire-resistive construction - That type of construction in which the walls, partitions, columns, floors and roof are noncombustible with sufficient fire resistance to withstand the effects of a fire and prevent its spread from story to story. See Table C202-2, State Building Construction Code.

Class A-Type 2, noncombustible construction - That type of construction in which the walls, partitions, columns, floors and roof are noncombustible and have less fire resistance than required for fire-resistive construction. See Table C202-2, State Building Construction Code.

Class B-Type 3, heavy timber construction - That type of construction in which the exterior walls are of masonry or other noncombustible materials having equivalent structural stability under fire conditions and a fire-resistance rating of not less than two hours; in which interior structural members including columns, beams and girders, are of heavy timber, in heavy solid or laminated masses, but with no sharp corners or projections or concealed or inaccessible spaces; in which floors and roofs are of heavy plank or laminated wood construction, or of any other material providing equivalent fire-resistance and structural properties. Noncombustible structural members may be used in lieu of heavy timber, provided the fire resistance of such members is not less than 3/4 hour.

Class B-Type 4, ordinary construction - That type of construction in which the exterior walls are of masonry or of other noncombustible materials having an equivalent structural stability under fire conditions and a fire-resistance rating of not less than two hours, the interior structural members being wholly or partly of wood of smaller dimensions than those required for heavy timber construction.

Class C-Type 5, frame construction - That type of construction in which the walls, partitions, floors and roof are wholly or partly of wood or other combustible material.

corridor - A passageway or hallway which provides a common way of travel to an exit or to another passageway leading to an exit. See definition of exit.

court, perimeter enclosed - An open, uncovered space surrounded on all sides by the exterior walls of a building or structure, or by such walls and an interior lot line of the same premises.

court, open - An open uncovered space which has at least one sice opening onto an open space.

crawl space - An open, unfinished space between the foundation walls and immediately below the first floor less than a full story in height. Clear height between finish grade and the underside of the first floor construction can be any height from 1 foot up to 5 or 6 feet. The surface is usually bare earth.

curb level - The elevation of the curb opposite the center of the front of the building. If a building faces on more than one street, the curb level shall be the average of the elevations of the curbs at the center of each side or front of the building. Where no curb level or equivalent has been established by the municipal authority, the average elevation of the finished grade immediately adjacent to the front of the building shall be considered as the curb level. If a building faces on more than one street where no curb level has been established, the average of the elevations of the finished grade on each street side of the building shall be considered as the curb level.

exit - A way of departure from the interior of a building or structure to the exterior at street or grade, including doorways, passageways, hallways, corridors, stairways, ramps, fire escapes, and all other elements necessary for egress or escape. A single exit is one separate path of travel to the exterior of a building at grade.

Doors from small individual rooms, while constituting means of egress from the room, are not referred to as exits except where they open directly to the outside or other place of safety. Doors from large rooms constitute an integral part of the exit system and are referred to as exits from the room. Two doors which are remote from each other and which provide separate means of egress constitute two exits, but if the doors are adjacent and lead to a common path of travel to the exterior, they constitute one exit.

fire alarm system - An approved installation of equipment for sounding a fire alarm.

fire damper - An approved automatic or self-closing noncombustible barrier designed to prevent the passage of air, gases, smoke, or fire through an opening, duct or plenum chamber.

fire detecting system - An approved installation of equipment which automatically actuates a fire alarm when the detecting element is exposed to fire or an abnormal rise in temperature.

fire limits - Boundary line establishing an area in which there exists, or is likely to exist, a fire hazard requiring special fire protection.

fire protection equipment - Apparatus, assemblies or systems either portable or fixed, for use in preventing, detecting, controlling or extinguishing fires.

fire resistance - That property of materials, or assembly of materials, or of construction which, under fire conditions, prevents or retards the passage of excessive heat, hot gases, or flames.

fire-resistance rating - Time in hours or parts thereof that a material, construction, or assembly will withstand fire exposure, as determined in a fire test made in conformity with generally accepted standards, or as determined by extension or interpretation of information derived therefrom.

fire resistive - The ability of materials, assemblies, constructions, or structures to resist fire and prevent its spread; fireproof.

fire separation - A construction of specific fire resistance separating the parts of a building.

fireproof - See construction classification, page A-2.

firestopping - A barrier effective against the spread of flames or hot gases within or between concealed spaces.

flame-resistant material - Material which is flame resistant by nature or has been made flame resistant in conformity with generally accepted standards.

flame spread - The propagation of flame over a surface.

flame spread rating - The measurement of flame spread on the surface of materials or their assemblies as determined by tests conducted in conformity with a generally accepted standard.

flammable - Capability of materials or combination of materials to ignite within 5 seconds when exposed to flame.

floor area - The floor area within surrounding walls of a building, or portion thereof.

flue - Enclosed passage, primarily vertical, suitable for removal to the outer air of the gaseous products of combustion.

generally accepted standard - A specification, code, rule, guide or procedure in the field of construction, or in a field related thereto, recognized and accepted as authoritative.

grade, finished - Natural surface of the ground, or surface of ground after completion of any change in contour.

ground floor - The story of a school building immediately below the main floor and also below finished grade, but one in which the finished grade is not above the normal height of a classroom window sill.

height, building - Vertical distance measured from curb or grade level to the highest level of a flat or mansard roof, or to the average height of a pitched, gabled, hip or gambrel roof, excluding bulkheads, penthouses and similar constructions enclosing equipment or stairs, providing they are less than 12 feet in height and do not occupy more than 30 per cent of the area of the roof.

hoistway - A vertical opening, space, or shaftway in which an elevator or dumbwaiter is installed.

horizontal exit - A protected opening through or around a fire wall, connecting two adjacent floor areas, each of which furnishes an area of refuge, and from each of which required exits lead to legal open spaces.

interior finish - Material applied directly to walls or ceilings for acoustical correction, surface insulation, decorative treatment, or similar purposes, including but not limited to, veneer wainscoting and paneling. Surface finishes of wallpaper or other materials which are not more than 1/28-inch thick and have no greater fire hazard than wallpaper, shall not be deemed to be interior finish.

interior trim - Material generally less than 12 inches in width, around openings in walls or ceilings, such as casings, stools, aprons, baseboards, chair rails, picture molds, cornice moldings, or moldings applied for decoration.

lobby - A lounge or waiting place adjacent to and connected with other spaces and also connected to a passageway serving as a principal entrance or exit.

lot line - A line dividing one premise from another, or from a street or other public space.

luminous ceiling - Light transmitting panels suspended below light sources and supported from the construction above.

masonry - A construction of units of such materials as clay, shale, concrete, glass, gypsum, or stone, set in mortar, including plain concrete, but excluding reinforced concrete.

mezzanine - An intermediate floor between the floor and ceiling of any story, covering less than the floor area immediately below. Space above and below a mezzanine shall have a minimum clear height of 7'-6".

municipality - A city, town or village.

noncombustible - Material or combination of materials which will not ignite and support combustion when heated at any temperature up to 1382°F. (750°C.), during an exposure of 5 minutes.

opening protective - Assembly of materials and accessories, including frames and hardware, installed in a wall, partition, floor, ceiling or roof opening to prevent, resist or retard the passage of fire, flame, excessive heat or hot gases.
--automatic. Constructed and arranged to operate other than manually; if open, it will close when subjected to a predetermined temperature or rate of temperature rise.
--self-closing. Arranged and equipped with devices which will insure closing after having been opened.

or equal - See Appendix IV-d

owner - Board of Education, Trustees, Board of Cooperative Services.

property line - Line establishing the boundaries of premises.

pupil space, pupil occupancy - Space within a building for pupil use or any space which one or more pupils may at some time occupy as contrasted to space of no pupil occupancy such as teachers rooms, custodians rooms, some stage rooms, boiler and incinerator rooms, fan rooms, some toilet rooms.

remote - At diagonally opposite corners or at opposite ends of a room or space.

repair - Replacement or renewal, excluding additions, of any part of a building, structure, device, or equipment, with like or similar materials or parts, for the purpose of maintenance of such building, structure, device, or equipment.

shaft - A vertical opening or enclosed space extending through two or more floors of a building, or through a floor and roof.

shall - As used in this pamphlet, is mandatory.

smoke stop - A partition in corridors, or between spaces to retard the passage of smoke, with any opening in such partition protected by a door equipped with a self-closing device.

sprinkler system - A complete automatic sprinkler system which is installed in compliance with generally accepted standards.

stage - Space used for theatrical presentations, instruction and demonstration purposes, usually at a level elevated from adjacent seating or audience space.

stairway - One or more flights of stairs and the necessary landings and platforms connected therewith to form a continuous passage from one floor to another.

story - Portion of a building which is between one floor level and the next higher floor level or the roof. If a mezzanine floor area exceeds one third of the area of the floor immediately below, it shall be deemed to be a story. A basement shall be deemed to be a story when its ceiling is 6 or more feet above the finished grade. A cellar shall not be deemed to be a story. An attic shall not be deemed to be a story if unfinished and without human occupancy.

street - Thoroughfare dedicated and accepted by a municipality for public use or legally existing on any map of a subdivision filed in the manner provided by law.

structural damage - Loosening, twisting, warping, cracking, distortion or breaking of any piece, or of any fastening or joint, in a structural assembly, with loss of sustaining capacity of the assembly. The following shall not be deemed to constitute structural damage: small cracks in reinforced concrete, perpendicular to the reinforcing bars; deformation of sheet material when a structural assembly is under applied load, which increases as such load increases but which disappears when such load is removed.

structural failure - Rupture; loss of sustaining capacity or stability; marked increase in strain without increase in load; deformation increasing more rapidly than the increase in imposed load.

structure - An assembly of materials, forming a construction framed of component structural parts for occupancy or use, including buildings.

temporary classrooms on school property - leased or purchased, prefabricated and transportable units made and assembled by commercial interests.

temporary quarters - Substandard space in a building owned or leased by a school district for pupil occupancy, meeting the requirements of Section 167 of the Commissioner's Regulations, and used on a temporary basis subject to yearly approval by appropriate authority.

toilet, individual pupil - Enclosed space for pupil use containing one to two water closets, which may also contain one or more lavatories and urinals.

toilet, gang pupil - Enclosed space containing three or more water closets, which may also contain one or more lavatories and urinals.

toilet, teacher - Enclosed space containing one or more water closets, which may also contain one or more lavatories and urinals not for public use.

toilet, public - Enclosed space containing one or more water closets which may also contain one or more lavatories and urinals.

veneer - Thin pieces of material used as a finished surface over another material.

wall, curtain - A nonbearing wall between columns or piers that is not supported at each story.

wall, fire - A wall of noncombustible construction, with qualities of fire resistance and structural stability, which completely subdivides a building into fire areas, and which resists the spread of fire.

wall, panel - A nonbearing wall built between columns in skeleton construction and wholly supported at each story.

wall, spandrel - Portion of an exterior wall between top of one opening and bottom of another opening in the story directly above.

yard - An open unoccupied space on the same lot, plot, or parcel of land on which the building stands, which extends the entire length of the front or rear or interior lot line.

APPENDIX II

Accepted Standards

1-AA	Aluminum Association
2-AASHO	American Association State Highway Officials
3-ACI	American Concrete Institute
4-AGA	American Gas Association
5-AISC	American Institute of Steel Construction, Inc.
6-AISI	American Iron and Steel Institute
7-API	American Petroleum Institute
8-ASA	American Standards Association, Inc.
9-ASCE	American Society of Civil Engineers
10-ASHRAE	American Society of Heating, Refrigerating and Air Conditioning Engineers
11-ASME	American Society of Mechanical Engineers
12-ASTM	American Society for Testing Materials
13-AWS	American Welding Society
14-AWWA	American Water Works Association
15-AWPA	American Wood Preservers' Association
16-AI	Asphalt Institute
17-CS	Commercial Standards
18-DA(USA)	Department of Agriculture, USA
19-DFPA	Douglas Fir Plywood Association
20-DH(NYS)	Department of Health, NYS
21-FCC	Federal Communications Commission
22-FPL	Forest Products Laboratory, Forest Service
23-FS	Federal Specification
24-H	Handbooks, U.S. Department of Commerce
25-HHFA	Housing and Home Finance Agency
26-IC(NYS)	Industrial Code Roles, N.Y.S. Department of Labor
27-NBBPVI	National Board of Boiler and Pressure Vessel Inspectors
28-NBFU	National Board of Fire Underwriters
29-NFPA	National Fire Protection Association
30-NLMA	National Lumber Manufacturers' Association
31-NYSBCC	New York State Building Construction Code
32-PCA	Portland Cement Association
33-PCI	Prestressed Concrete Institute
34-PSC	Public Service Commission
35-RSC	Refrigeration Safety Code
36-SJI	Steel Joist Institute
37-SPI	Society of Plastic Industry
38-SPR	Simplified Practice Recommendations
39-ULI	Underwriters' Laboratories, Inc.

II

American Gas Association Laboratories (AGA)

	Information Letter 90

American Standards Association, Inc. (ASA)

01.1	Woodworking Machinery
21.33	Installation of Gas Equipment in Large Boilers
A 9.1	Building Exits Code
A 13.1	Identification of Piping Systems
A 17.1	Elevators, Dumbwaiters, and Escalators
A 23.1	Code for School Lighting
A 40.7	American Standard Plumbing Code
A 42.1	Gypsum Plastering
A 42.2) A 42.3)	Portland Cement and Stucco Plastering
A 58.1	Building Code Requirements for Minimum Design Loads in Buildings
A108	Installation of Tile
A117.1	Making Buildings and Facilities Accessible to, and Usable by, the Physically Handicapped
B 9.1	Mechanical Refrigeration (ASRE 15-58)
B 15.1	Mechanical Power Transmission Apparatus
B 20.1	Conveyors, Cableways, and Related Equipment
B 31.8	Gas Transmission and Distributing Piping Systems
B 57.1	Compressed Gas Cylinder Valve Outlet and Inlet Connections (CGA V.1)
C 1.	National Electrical Code (NBFU 70 or NFPA 70)
C 2.	National Electrical Safety Code (NBS Handbook H30)
C 5.	Protection Against Lighting (NFPA 78)
	C 5.1 Part I Protection of Persons
	C 5.2 Part II Protection of Buildings and Miscellaneous Property
	C 5.3 Part III Protection of Structures Containing Flammable Liquids and Gases
Z 2.1	Head, Eye and Respiratory Protection
Z 4.2	Drinking Fountains
Z 8.1	Laundry Machinery and Operations
Z 9.2	Design and Operation of Local Exhaust Systems
Z 9.3	Design, Construction, Operation and Ventilation of Spray Finishing Operations
Z 12.1	Installation and Operation of Pulverized Fuel Systems (NBFU 60)
Z 20.3	Places of Outdoor Assembly, Grandstands and Tents (NFPA 102)
Z 21.10.1	Gas Water Heaters
Z 21.13	Central Heating Gas Appliances
Z 21.30	Installation of Gas Piping and Gas Appliances (NFBU 54)
Z 35.1	Industrial Accident Prevention Signs
Z 49.1	Welding and Cutting
Z 66.1	Minimize Hazards to Children from Residual Surface Coating Materials

ASME	Boiler and Pressure Vessel Code

II

National Board of Fire Underwriters(NBFU)

10	First Aid Fire Appliances
13	Sprinkler Systems
24	Outside Protection(Yard Piping Systems)
30	Flammable Liquids
31	Oil Burning Equipment
33	Spray Finishing
37	Internal Combustion Engines
51	Gas Systems for Welding and Cutting
58	Liquified Petroleum Gases(Storage and Handling)
60	Pulverized Coal Systems
70	National Electrical Code
71	Central Station Protective Signaling Systems
72	Proprietary Protective Signaling Systems
82	Incinerators
86	Class A Ovens and Furnaces
88	Garages
90A	Air Conditioning and Ventilating Systems Other Than Residence Type
90B	Residence Type Warm Air Heating and Air Conditioning Systems
91	Blower and Exhaust Systems for Dust Stock and Vapor Removal or Conveying

National Fire Protection Association(NFPA)

13	Sprinkler Systems
52	Liquified Petroleum Gas Piping and Appliances
70	National Electrical Code
101	Building Exits Code

American Society of Testing Materials(ASTM)

A-7	Caps, Bases, Brackets, Stiffeners
A-36	Structural Steel
A-48	Cast Iron
A-53	Standard Weight Black Steel Pipe
A-120	Galvanized W.I. Pipe
A-141	Rivet Steel
A-167	Stainless Steel Sheets and Plates(Grade 2, Type 302)
A-185	Reinforcing Mesh
A-233	Electrodes for Arc Welding
A-245) A-246)	Steel Sheets
A-276	Stainless Steel Bars(Type 302, No. 4 Polished Finish)
A-305	Reinforcing Steel
A-307	Rough Bolts
B-5	Sheet Copper
B-32	Solder
B-88	Rigid Copper Tubing
B-152	Finished Copper Sheets

ASTM(cont'd)

C-5	Quick Lime
C-6	Hydrated Lime
C-28	(Gauging Plaster (Gypsum Plaster
C-31	Concrete Test Cylinders
C-34	Load Bearing Tile
C-35	Vermiculite
C-36	Insulating Gypsum Wallboard
C-39	Concrete Tests
C-49	Concrete Tests
C-56	Non-Load Bearing Tile
C-61	Keene's Cement
C-62	Common Brick
C-64-48	High Temperature Brick
C-90	Concrete Masonry Units
C-91	Masonry Mortar
C-94	Transit Mix Concrete
C-126	Facing Material Glaze Brick
C-143	Concrete Test Cylinders
C-150	High Early Portland Cement, Type III Portland Cement, Type I White Portland Cement
C-206	Hydrated Lime, Type S
C-208	Roof Insulation Fiberboard
C-262	Thermal Batt Insulation
C-270	Masonry Mortar
D-173	Cotton Fabric Reinforcing
D-226	Asphalt Saturated Felt
D-227	Roofing Felt
D-249	Mineral Surfaced Roofing
D-312	Asphalt
D-450	Roofing Pitch, Type B
E-84-59T	Flame Retardant Plasticizers and Pigments
S-450	Coal Tar Pitch

Public Service Commission(PSC)

Excerpts from the Codes, Rules and Regulations of the State of New York, Title 16, Volume B, Chapter III, Gas Utilities, Subchapter C, Safety, Part 255, Transmission and Distribution of Gas.

TRANSMISSION OF GAS
(An Excerpt From The Public Service Commission Code)

Section 255.0 (Introductory). Every gas corporation including municipalities engaged in the transportation of gas within the State of New York by pipeline at pressures in excess of two pounds per square inch gauge shall make the following improvements and take the precautions and safeguards hereinafter enumerated.

255.1 Compliance with A.S.A. Code. (a) Every gas pipeline shall be constructed and operated, except as otherwise provided in these rules, in compliance with the provisions of section 8, chapters 1-6, pages 9-34 inclusive, of the "American Standard Code for Pressure Piping-Gas Transmission and Distribution Piping Systems", the presently effective code being A.S.A. B.31.8 /Latest/ (referred to herein as A.S.A. Code).
(b) The provision of the A.S.A. Code specifying standards of construction for pipelines within cities and villages shall be applicable to construction in such areas regardless of any provision in said Code permitting lower standards for pipelines within cities and villages depending upon the concentration of population therein.

255.2 Pipelines outside of cities and villages. Gas pipelines not within the boundaries of cities and villages, shall nevertheless be constructed in accordance with the standards in the A.S.A. Code for gas pipelines within such boundaries whenever a gas pipeline is constructed within 300 feet of the places described below, or whenever a gas pipeline to be operated at pressures in excess of 500 psig is constructed within 500 feet of such places, viz.:

(a) A place of residence
(b) Property which has been zoned as residential
(c) A building used for public gatherings including railroad stations
(d) Any schoolbuilding, hospital, public building, or any playground
(e) A building devoted to a business in which more than three people are employed.

255.3 Proscribed areas. Gas pipelines which are to be operated at a maximum pressure in excess of 250 psig shall not be installed within 100 feet of any building intended for human occupancy, unless such installation is authorized and approved by the Public Service Commission.

PSC (cont'd)

DISTRIBUTION OF GAS

255.50 (Introductory). Every gas corporation and municipality engaged in the distribution of gas within the State of New York shall make the following improvements and take the precautions and safeguards hereinafter enumerated.

255.51 Relief valves. (a) All regulator stations supplying any gas system shall be provided with a sufficient number of relief valves or other protective devices to insure that the complete failure of one or more regulator stations shall not impose pressures on any part of the system beyond those which it is designed for or protected against.
(b) A sufficient number of relief valves shall be installed at or near regulator stations in low pressure areas, such valves to be of sufficient number and capacity to insure that the pressure of gas will at no time exceed a maximum of two pounds per square inch gauge at the inlet of any gas service lateral on each low pressure distribution system.
(c) The installations required by subdivisions (a) and (b) above shall be made with due regard to hazards to life and property by the venting of gas into the atmosphere in congested areas; in the event that such valves cannot be installed in congested areas without creating a hazard to life and property, alternative protective devices shall be installed to insure against the potential dangers arising from the failure of regulator equipment.
(d) The protective devices ordered in subdivisions (a), (b) and (c) hereof, respectively, shall be maintained by semiannual testing to determine that they are in operable condition, and an internal inspection shall be made at least once each year of the mechanism of such devices, and overhauled, if necessary.

255.53 Ventilation at regulator stations. All regulator stations shall be provided with adequate ventilation, the ventilation of underground stations to include double duct ventilation, each duct to be of a size sufficient to insure adequate ventilation and not less than four inches in diameter and extending a suitable height above ground level, such double duct ventilation to further provide for the venting of diaphragms of the regulators to the outside atmosphere; upon the installation of such double duct ventilation all openings in manhole covers above regulator stations shall be sealed to minimize the accumulation of water in underground regulator stations.

255.54 Exterior shut-off valves. Exterior shut-off valves shall be installed on all lines to regulator stations other than low-pressured lines, for use in an emergency to stop the flow of high-pressure gas, such valves to be installed at an accessible point and located at least 50 feet and not more than 1,000 feet from the regulator stations. In unusual cases in which it is impracticable because of interfering subsurface structures to locate a valve at least 50 feet distant, the shut-off valve may be located at a point less than 50 feet but in no case less than 25 feet from the regulator station. Such valves shall be tested and checked at least once a year to insure that they are in proper operating condition.

255.55 Multistage pressure regulation. In all cases of new installations where gas pressures are reduced in two or more stages, the necessary regulators shall be installed in separate stations, separated by a distance of at least 50 feet, thus minimizing the potential dangers of the failure of one stage of regulator equipment, due to fire, explosion or damage of any kind, from adversely affecting the operation of other stages of regulator equipment; in cases where existing regulator equipment and stations do not meet the requirements of this rule for new installations, the gas corporation shall prepare and submit an adequate program for minimizing the hazards thereof.

255.56 Regulator station construction. (a) All drain lines and connections from underground regulator stations to sewers, shall be eliminated in order to minimize the danger of escaping gas flowing therein. Upon such elimination, steps shall be taken to adequately prevent the accumulation of water in regulator stations by means such as waterproofing the walls of such stations and providing sumps.
(b) All piping passing through walls or floors of underground stations shall be tightly sealed to prevent the seepage of gases or liquids.
(c) All auxiliary equipment, such as oil foggers and dust collectors in regulator stations, shall be kept to a minimum and any materials or articles stored in such stations, shall be removed to avoid the potential hazards to safe operation from their presence.
(d) All electrical equipment required for regulator stations shall be installed in compliance with the effective provisions of the National Electrical Code.
(e) All wooden supports under regulator equipment and piping in regulator stations shall be removed and in place thereof proper and suitable fireproof supports shall be installed.
(f) In underground stations, manhole covers shall be installed in such a manner as to prevent the cover from falling on the regulator equipment and damaging regulator equipment.

255.57 Odorization of gas. All gas distributed and transmitted shall be adequately odorized so as to render it readily detectable by the public and employees of gas corporations, the equipment to be used in such odorization to be sufficient to insure reasonably uniform odorization under varying conditions, such equipment to be installed in such a manner as not to be a nuisance to nearby residents by the escaping of odorant fumes. An appropriate record of the odorization practices shall be maintained and daily inspection of the odorization equipment shall be made, or, in the alternative, a sufficient number of tests shall be made to show whether the gas is adequately odorized throughout the distribution system. Every gas corporation shall keep the commission informed of the type of odorant used, the ratio of odorant to gas and the location of the odorization stations.

255.59 Tamper-proof service cocks. Tamper-proof service cocks of the non-binding and non-lifting core type shall be installed on all gas services requiring the use of a house regulator; such service cocks shall be inspected and tested at reasonable intervals.

255.60 Pressure standards. (a) Definitions. (1) The term low pressure distribution system shall be defined as being a gas distribution piping system in which the pressure is substantially the same as the standard pressure delivered to consumers' appliances and where house regulators are not required.
(2) The term high pressure distribution system shall be defined as being a gas distribution piping system in which the pressure is higher than the standard pressure delivered to consumers' appliances and where house regulators are required.
(b) Standard minimum pressure. Each gas corporation shall maintain a pressure throughout its low pressure distribution systems, as measured at the consumer's end of the service pipe to any consumer, of not less than four inches of water column gauge where the heating value of the distributed gas is 700 or more British thermal units per cubic foot and of not less than three inches of water column gauge where the heating value of the distributed gas is less than 700 British thermal units per cubic foot.
(c) Standard maximum pressure. Each gas corporation shall maintain a pressure throughout its low pressure distribution systems, as measured at the consumer's end of the service pipe to any consumer, of not more than 12 inches of water column gauge.
(d) Variation of pressure. The maximum daily pressure variation shall not exceed a total range of 50 per cent of the maximum gauge pressure experienced during that day at any point in the low pressure distribution systems of each gas corporation, as measured at the consumer's end of the service pipe to any consumer.
(e) Appliance regulators. In order to achieve maximum efficiency and safety of operation of the appliances of its consumers each gas corporation shall promote the installation of appliance regulators in its low pressure distribution systems, particularly where pressure variations exceeding a range of 25 per cent of the maximum gauge pressure may be expected.
(f) Special conditions. Where a gas corporation requires that all of its consumers in a given low pressure distribution system shall provide individual pressure regulators for all of their appliances, said gas corporation may request this commission, by a letter signed by a responsible official of the gas corporation, for authority to maintain standards of pressure other than those required herein in said low pressure distribution system.

PSC (cont'd)

255.61 Curb cocks. Curbcocks, usable in emergency to shut off the supply of gas, shall be installed on all high-pressure gas services where the regulator is located within the customer's premises and on all low-pressure gas services wherever gas is supplied to a theater, church, school, factory or other building where large numbers of persons assemble; such curb cocks shall be inspected at reasonable intervals and when such devices are located on services supplying a theater, church, school, factory or other building where large numbers of persons assemble, the same shall be inspected at least once each year.

II

Federal Specifications:

DD-G-451a	Glass
HH-C-561b	Corkboard Insulation
HH-F-341a	Preformed Expansion Joint Filler
LLL-L-351A	Battleship Linoleum
LLL-L-367	Jaspe or Marbleized Linoleum
L-T-00345	Vinyl Asbestos Tile
QQ-S-636	Hollow Metal Work
SS-A-118B	Acoustical Mineral Tile
SS-C-153, Type I	Bituminous Plastic Cement
SS-R-531	Roof Planks
SS-T-306B	Asphalt Tile
SS-T-308B	Ceramic and Quarry Tile
TT-P-86A, Type I	Shop Coat on Steel(Painting)
TT-R-781a	Metal Sash Putty
TT-R-791a	Wood Sash Putty
TT-W-251	White Lead Paste
WW-P401	XH Cast Iron Pipe
ZZ-T-301A	Rubber Floor Tile

APPENDIX III A

EXCERPTS FROM LAWS RELATING TO BUILDING PROJECTS

EDUCATION LAW - III A-1

Article 9, Section 408. Plans and specifications of school buildings must be approved by commissioner of education.

1. No schoolhouse shall hereafter be erected, repaired, enlarged or remodeled in any school district except in a city school district in a city having seventy thousand inhabitants or more, at an expense which shall exceed one hundred thousand dollars*, until the plans and specifications thereof shall have been submitted to the commissioner of education and his approval endorsed thereon. Such plans and specifications shall show in detail the ventilation, heating and lighting of such buildings. (*See P. A-22)

   In the case of a school district in a city having seventy thousand inhabitants or more, all the provisions previously set forth in this subdivision shall apply, except that the commissioner may waive the requirement for submission of plans and specifications and substitute therefor the requirement for submission of an outline of such plans and specifications for his review. Such outline shall be in a form which he may prescribe from time to time.

   In either case, the commissioner may, in his discretion, review plans and specifications for projects estimated at an expense of less than one hundred thousand dollars. (See P. A-22)

2. The commissioner of education shall not approve the plans for the erection of any school building or addition thereto or remodeling thereof unless the same shall provide for heating, ventilation, lighting, sanitation and health, fire and accident protection adequate to maintain healthful, safe and comfortable conditions therein.

3. The commissioner of education shall approve the plans and specifications, heretofore or hereafter submitted pursuant to this section, for the erection of any school building or addition thereto or remodeling thereof on the site or sites selected therefor pursuant to this chapter, if such plans conform to the requirements and provisions of this chapter and the regulations of the commissioner adopted pursuant to this chapter in all other respects; provided, however, that the commissioner of education shall not approve the plans for the erection of any school building or addition thereto unless the site has been selected with reasonable consideration of the following factors; its place in a comprehensive, long-term school building program; area

required for outdoor educational activities; educational adaptability, environment, accessibility; soil conditions; initial and ultimate cost.

4. No funds voted by a district meeting or other competent authority in any school district to which the provisions of subdivision one of this section are applicable, exceeding the amounts specified in such subdivision, shall be expended by the trustees or board of education until the commissioner of education shall certify that the plans and specifications for the same comply with the provisions of this section.

5. In a city having a population of one million or more, all designing, draughting and inspecting necessary in connection with the construction, additions to, alterations and maintenance of schoolhouses shall be performed by a bureau established and maintained for this purpose under the board of education. The work of this bureau shall be performed by civil service employees in the classified civil service under the direction of the superintendent of school buildings, design and construction, except that repairs, betterment and maintenance of heating and ventilating plants and equipment, elevators and mechanical equipment shall remain under the direction of the superintendent of plant operation and maintenance. In a special case upon approval of the board of estimate, such designing, draughting or inspecting may be otherwise performed.

Section 408-a. Plans and specifications for construction of new school buildings.

1. The superintendent of public works, after consultation with the commissioner of education and subject to the approval of the director of the budget, shall promptly prepare or acquire as many master sets of complete plans and specifications for the construction of new school buildings and appurtenant facilities as shall be sufficient to provide at least six different master sets each for elementary, junior high and high schools, based on the number of pupils to be accommodated therein. Such plans and specifications shall be prepared so as to provide adequate classrooms and other necessary space and facilities at the lowest cost consistent with sound construction principles and practices, and the attainment of educational objectives, and shall provide for heating, ventilation, lighting, sanitation and health, fire and accident protection adequate to maintain healthful, safe, and comfortable conditions therein. Such plans and specifications shall be so prepared that any possible future addition to any such school building may be economically effectuated. In addition, the superintendent of public works shall, as often as he deems advisable but at least annually, review such master sets and, after consultation with the commissioner of education, and subject to approval of the director of the budget, may revise or cancel any of such sets or prepare new sets.

2. The commissioner shall cause duplicates of such master plans and specifications to be made, and he shall furnish the same to any school district making a request therefor for a reasonable charge sufficient to cover the cost of reproducing such plans and specifications.

3. Plans and specifications prepared and furnished pursuant to the provisions of this section may be adopted and used in any school district as the plans and specifications for the construction of any new school building or appurtenant facility hereafter to be erected.

4. Nothing herein contained shall preclude any school district from retaining an architect and/or engineer in connection with the use of such master plans and specifications.

Section 409. School building regulations in relation to health and safety.

All school buildings of school districts other than city school districts of cities having one hundred twenty-five thousand inhabitants or more shall comply with such regulations as the commissioner of education shall adopt from time to time for the purpose of insuring the health and safety of pupils in relation to proper heating, lighting, ventilation, sanitation and health, fire and accident protection.

Article 43, Section 2117

3. The commissioner of education shall prepare, based on information submitted to him by school districts, periodic reports covering new school buildings giving information about them including but not limited to the following:

    1. Cost of site.
    2. Cost of site improvement including roads, parking, play fields, and utility lines to the building wall.
    3. Original furnishings, equipment and apparatus.
    4. Professional fees.
    5. Incidental costs.
    6. Total cost of building.
    7. Cost of building per pupil.
    8. Cost of building per gross square foot.
    9. Cost per gross square foot of the heating and ventilating.
    10. Cost per gross square foot of the plumbing.
    11. Cost per gross square foot of the electrical work.
    12. Square foot per pupil in the total gross area.
    13. Square foot per pupil in the net area of the regular and special classrooms.
    14. Square foot per pupil in the net area of other rooms used for educational, health, administrative or social purposes such as the cafeteria, auditorium, gymnasium, kitchen and library.

15. Square foot per pupil of the remaining difference between the gross area and the sum of thirteen and fourteen which would include toilet rooms, general storage, corridors, stair enclosures, janitor closets, boiler rooms, building machinery rooms and the area occupied by the walls of the building.
16. An outline of the school plan.
17. A brief outline specification for the building construction.
18. The name of the architect.
19. The name of the mechanical engineer.
20. The name of the structural engineer.
21. Whether single or multiple bidding was used.

Article 147, Section 7302

2. ....no official of this state .... shall accept or approve any plans or specifications that are not stamped (a) with the seal bearing the authorized facsimile of the signature of a licensed architect or a licensed professional engineer duly licensed in this state ....

Section 7307

1. This article shall not be construed to affect .... alterations to any building or structure costing ten thousand dollars or less which do not involve changes affecting the structural safety and/or public safety thereof ....

2. This article shall not apply to farm buildings, including barns, sheds, poultry houses, and other buildings used directly and solely for agricultural purposes; nor to residence buildings of gross area of fifteen hundred square feet or less, not including garages, carports, porches, cellars, uninhabitable basements or uninhabitable attics.

*Projects estimated at $10,000, or more, currently require review.

LABOR LAW - III A-2

Article 8, Section 220e

(b) .... no contractor, subcontractor, nor any person on his behalf shall, in any manner, discriminate against or intimidate any employee hired for the performance of work under this contract on account of race, creed, color, or national origin ....

Section 220d

The advertised specifications for every contract for the construction, reconstruction, maintenance and/or repair of public work to which the state, county, town and/or village is a party shall contain a provision stating the minimum hourly rate of wage which can be paid and the minimum supplement that can be provided, as shall be designated by the industrial commissioner, to the laborers, workingmen or mechanics employed in the performance of the contract, either by the contractor, sub-contractor or other person doing or contracting to do the whole or a part of the work contemplated by the contract, and the contract shall contain a stipulation that such laborers, workingmen or mechanics shall be paid not less than such hourly minimum rate of wage and provided supplements not less than the prevailing supplements.

Section 222

.... preference shall be given to citizens of the State of New York. Persons other than citizens of the State of New York may be employed when such citizens are not available ....

GENERAL MUNICIPAL LAW - III A-3

Article 5-A, Section 101. Separate specifications for certain public work.

1. Every officer, board or agency of a political subdivision or of any district therein, charged with the duty of preparing specifications or awarding or entering into contracts for the erection, construction, reconstruction or alteration of buildings, when the entire cost of such work shall exceed fifty thousand dollars, shall prepare separate specifications for the following three subdivisions of the work to be performed:

   a. Plumbing and gas fitting;
   b. steam heating, hot water heating, ventilating and air conditioning apparatus; and
   c. Electric wiring and standard illuminating fixtures.

2. Such specifications shall be drawn so as to permit separate and independent bidding upon each of the above three subdivisions of work. All contracts awarded by any political subdivision or by an officer, board or agency thereof, or of any district therein, for the erection, construction, reconstruction or alteration of buildings, or any part thereof, shall award the three subdivisions of the above specified work separately in the manner provided by section one hundred three of this chapter. Nothing in this section shall be construed to prevent any political subdivision from performing any such branches of work by or through their regular employees, or in the case of public institutions, by the inmates thereof.

Section 102

1. .... charged with the duty of preparing plans and specifications for the awarding or entering into contracts for the performance of public work shall require, as a deposit to guarantee the safe return of such plans and specifications, the payment of a fixed sum of money, not exceeding one hundred dollars for each copy thereof ....

Section 103. Advertising for bids; letting of contracts; criminal conspiracies.

1. .... except as otherwise expressly provided by an act of the legislature or by a local law adopted prior to September first, nineteen hundred fiftythree, all contracts for public work involving an expenditure of more than twenty-five hundred dollars and all purchase contracts involving an expenditure of more than one thousand dollars, shall be awarded by the appropriate officer, board or agency of a political sub-

division or of any district therein including but not limited to a soil conservation district, to the lowest responsible bidder furnishing the required security after advertisement for sealed bids in the manner provided by this section. In cases where two or more responsible bidders furnishing the required security submit identical bids as to price, such officer, board or agency may award the contract to any of such bidders. Such officer, board or agency may, in his or its discretion, reject all bids and readvertise for new bids in the manner provided by this section.

2. Advertisement for bids shall be published in the official newspaper or newspapers, if any, or otherwise in a newspaper or newspapers designated for such purpose. Such advertisement shall contain a statement of the time when and place where all bids received pursuant to such notice will be publicly opened and read. Such board or agency may by resolution designate any officer or employee to open the bids at the time and place specified in the notice. Such designee shall make a record of such bids in such form and detail as the board or agency shall prescribe and present the same at the next regular or special meeting of such board or agency. All bids received shall be publicly opened and read at the time and place so specified. At least five days shall elapse between the first publication of such advertisement and the date so specified for the opening and reading of bids.

....

4. Notwithstanding the provisions of subdivision one of this section, in the case of a public emergency arising out of an accident or other unforeseen occurrence or condition whereby circumstances affecting public buildings, public property or the life, health, safety or property of the inhabitants of a political subdivision or district therein, require immediate action which cannot await competitive bidding, contracts for public work or the purchase of supplies, material or equipment may be let by the appropriate officer, board or agency of a political subdivision or district therein.

5. Upon the adoption of a resolution by a vote of at least two thirds of all the members of the governing body of a political subdivision or district therein stating that, for reasons of efficiency or economy, there is need for standardization, purchase contracts for a particular type or kind of equipment, material or supplies of more than one thousand dollars may be awarded by the appropriate officer, board or agency of such political subdivision or any such district therein, to the lowest responsible bidder furnishing the required security after advertisement for sealed bids therefor in the manner provided in this section. Such resolution shall contain a full explanation of the reasons for its adoption.

....

Note 7a. Specifications

....

While a municipality or school district may specify a particular article or object as a general standard it must also provide that any other manufacturer of a similar object may meet the specifications if his product is reasonably equivalent to that mentioned as the standard. Matter of Appeal of Paul W. Hotaling, 1954, 75 St. Dept. (Educ) 97.

Specifications that do not provide for equivalencies, in effect, exclude full competition. Matter of the Appeal of Coach and Equipment Sales Corporation, 1954, 75 St. Dept. (Educ.) 94.

In advertising for bids under this section, a municipality may specify a particular article or object which it regards as its general standard, but it must provide that any other manufacturer of a similar object may meet the specifications if such product is reasonably equivalent to that mentioned as the standard. Matter of Appeal of Edward V. Gehrke, Bert Barnhart, and David K. Blachly, 1955, 75 St. Dept. (Educ.) 15.

Where specifications advertised followed in every necessary detail exact description of desired product and did not provide for others to meet specifications if their products were reasonably equivalent, such advertisement was defective and did not comply with requirements of this section. Id.

....

APPENDIX III A.4

LOCAL FINANCE LAW (III A.4) ARTICLE 2, SECTIONS 11, 12 AND 13

11. Buildings. The acquisition or construction of buildings not included in any other subdivision hereof, whether or not including grading or improvement of the site, original furnishings, equipment, machinery or apparatus required for the purposes for which such buildings are to be used, as follows:

    (a) Class "A" (fireproof and certain fire-resistant) buildings.

        (1) Buildings, the walls of which are constructed of brick, stone, concrete, metal or other incombustible material, and in which there are no wooden beams or lintels, and in which the floors, roofs, stair halls and other means of vertical communication between floors and their enclosures are built entirely of brick, stone, metal or other incombustible materials, and in which no woodwork or other inflammable material is used in any of the rough partitions, floor or ceiling structures, or
        (2) Buildings, not more than one story above the ground, the outer walls of which are constructed of brick, stone, metal stucco or other fire-resisting material and which are to be used as schoolhouses by school districts wholly outside of a city, thirty years.

    (b) Class "B" (fire-resistant) buildings. Buildings, the outer walls of which are constructed of brick, stone, concrete, metal, stucco or other fire-resisting material, twenty years.

    (c) Class "C" buildings. Buildings which are neither class "A" nor class "B", as defined in items (a) and (b) above, including any such building which is rebuilt or altered so that it, together with any addition or vertical or other extension is not fireproof or fire-resisting, as thus defined, fifteen years.

12. Additions to or conversion of buildings:

    (a) (1) The construction of an addition or additions to or the reconstruction of a class "A" building or the conversion of a class "B" or class "C" building into a class "A" building, twenty years.
        (2) The construction of an addition or additions to or the reconstruction of a class "B" building or the conversion of a class "C" building into a class "B" building, fifteen years.
        (3) The construction of an addition or additions to or the reconstruction of a class "C' building, ten years.

(b) The periods of probable usefulness set forth in item (a) above shall include original furnishings, equipment, machinery or apparatus required for the purposes for which such additions to such buildings or for which reconstructed or converted buildings are to be used.

(c) A building which is to be attached to an existing building or buildings shall be deemed to be a new building and not an addition if the probable useful life thereof is not dependent upon the useful life of such existing building or buildings.

(d) The terms "class 'A' building" and "class 'C' building", as used in this subdivision, shall mean such buildings as they are described in subdivision eleven of this paragraph.

13. Certain building alterations. The installation or reconstruction of a heating, lighting, plumbing, ventilating, elevator or power plant or system in a building when not in connection with the original construction or the reconstruction of such building, in a class "A" or "B" building, ten years; in a class "C" building, five years. The terms "class 'A' building", "class 'B' building", and "class 'C' building", as used in this subdivision shall mean such buildings as they are described in subdivision eleven of this paragraph.

Article 2, Section 165. Deposit and use of proceeds from sale of bonds, bond anticipation notes, capital notes or budget notes.

The proceeds, inclusive of premiums, from the sale of bonds...shall be deposited in a special account in a bank or trust company..., shall not be commingled with other funds of the issuer, and shall be expended only for the object or purpose for which such obligations were issued. In the event that any portion of the proceeds...is not expended for the object or purpose for which such obligations were issued, such portion shall be applied only to the payment of the principal of and interest on such obligations, respectively.

APPENDIX III B

REGENTS RULES AND REGULATIONS OF THE COMMISSIONER OF EDUCATION

Regents Rules

§ 207 Regulations. The Commissioner shall make regulations governing the requirements for the plans and specifications for the erection, repair, enlargement and remodeling of school buildings.

§ 208 General requirement. Each school district shall provide suitable and adequate school buildings and grounds for the instruction and accommodation of the pupils of such district.

REGULATIONS OF THE COMMISSIONER OF EDUCATION

ARTICLE XX

SCHOOL BUILDINGS AND GROUNDS

§ 165. Buildings and grounds

To obtain the approval of the Commissioner of Education of plans and specifications, the following requirements as interpreted by the Commissioner shall be complied with.

1. General

a. Plans and specifications for the erection, repair, enlargement or remodeling of a school building, required to be submitted to the Commissioner of Education for his approval as provided in section 408 of the Education Law, shall be submitted in accordance with the procedure set forth by the Commissioner of Education. When approved, one set shall be placed on file in the Education Department and the other returned to the trustee or board of education, with the approval indorsed thereon. Changes in approved plans and specifications, made either before or after contracts are let, shall also be approved by the Commissioner of Education before they become effective.

b. No construction materials shall be used and no type of construction shall be permitted which would endanger the health, safety or comfort of the children of the school.

c. While school building design should, as far as practicable, contribute to the attractiveness of the community, extravagance in materials and in planning shall be avoided.

d. The products or commodities required to be used by such plans and specifications shall not be limited to those manufactured by any specified manufacturer.

e. Construction details shall conform to commonly accepted standards for public work.

f. Plans and specifications for sewage disposal systems shall be submitted to the Division of Sanitation, State Department of Health, for acceptance prior to the approval of the building plans. The approval by the Commissioner of Education of plans and specifications for a school building shall not be construed as an approval of any sewage disposal system.

g. Exits, stairs and corridors shall be so planned and spaced as to permit ease of pupil circulation in the building and to insure ready escape from the building in case of an emergency.

h. Provision shall be made for facilities sufficient for carrying out all educational requirements mandated by statute or by Regents Rules or Commissioner's Regulations.

i. The number, type and capacity of building facilities shall not exceed the educational need of the area to be served nor the financial ability of the district to defray the cost.

j. Contracts for school building construction shall not be entered into for amounts exceeding the architect's estimates of the cost of the building as reported on the application for the Commissioner's approval without consultation with the Education Department.

k. The architect's or engineer's specifications shall provide that mechanical trade contractors or their representatives shall instruct the board of education or their representatives in the proper operation and service of all mechanical equipment at the time of completion and before acceptance of the school building by the board of education.

2. Visual comfort and efficiency in a school building

a. Objective

(1) The objective in providing school lighting shall be the securing of adequate levels of illumination for the visual task in an environment of balanced brightness.

b. Natural lighting

(1) Any classroom to be occupied during the major portion of the day by the same group of children shall be oriented so as to receive sunlight for some part of the day.

(2) Daylight may be used all or part of the time as the sole source of classroom illumination or in combination with artificial light. In other words, either natural or artificial illumination may be the chief source of light.

(3) Openings admitting daylight shall be located and designed to avoid glare and objectionable shadows.

c. Artificial lighting

(1) School buildings shall be provided with sufficient and suitable artificial light to conduct the school activities in the absence of natural light.

d. Fenestration

(1) Each classroom shall have a principal fenestration with length equal to a major portion of the length of the window wall(or walls).

(2) Principal fenestration shall permit an unobstructed view of the exterior.

e. Ceiling height

(1) The ceiling height of any classroom shall be properly proportioned to the size and shape of the room.

f. Interior color and finish

(1) The color and finish of ceilings, walls, floors, furniture and equipment shall be selected to provide a pleasing and stimulating environment and to obtain low brightness differences and freedom from glare.

3. Heating and ventilating

a. Thermal environment during the heating season. See page 35, S505.

b. Atmospheric hazards and quality

(1) In classrooms, provision for air change shall be made which, in the judgment of the Department, will provide a minimum air change of 10 cubic feet per minute per occupant when the outdoor air temperature is 35° F. or above.

(2) In rooms planned for close assembly a minimum air change of 10 cfm per occupant shall be provided in order to remove odors. Additional air change, depending largely upon wall exposure, may be required for effective thermal operation in mild weather.

(3) Toxic Substances. See S507.

§ 166. Plans and specifications

The Commissioner of Education shall determine whether or not the plans and specifications comply with the Commissioner's Regulations.

§ 167. Health and safety regulations for existing school buildings

1. Pursuant to the provisions of section 409 of the Education Law, in order to insure the health and safety of pupils in relation to heating, lighting, ventilation, sanitation and health, and fire and accident protection, all school buildings of school districts other than city school districts of cities having 125,000 inhabitants or more shall meet the following:

a. There shall be at least two means of egress remote from each other leading from each floor of pupil occupancy for all school buildings so that when a pupil enters into a corridor from a room of pupil occupancy, he shall have a choice of two unobstructed means of egress in different directions. Corridor pockets not exceeding one and one-half times the width of the corridor and where classroom doors within the pockets are 15 feet or more from the stairwell will be permitted. Classrooms or other spaces for pupil occupancy above the first or ground floor which are beyond stairs and do not have two optional directions of travel at the classroom door may have a door to the corridor not more than 20 feet beyond the stairway provided the following conditions are met:

(1) The stairway shall be equipped with enclosures to control the spread of smoke and fire. The doors to these stair enclosures shall be designed to be kept normally closed and shall not be secured in the open position. All doors designed to be kept normally closed shall bear signs reading "Fire Door--Keep Door Closed" in letters not less than 3 inches high. However, stair enclosure doors may be held open if a release device is provided, and so arranged that a detection of fire and/or smoke will cause an interruption of electric current and the doors will be released, or

(2) Each classroom or other space for pupil occupancy beyond the stairs shall be provided with a direct exit to the outside, or

(3) The building shall be provided with an automatic sprinkler system or an automatic fire and/or smoke detection system as approved by the Commissioner of Education, and

(4) In addition to any of the conditions set forth in subparagraphs 1, 2, and 3 of this paragraph the Commissioner of Education may in appropriate instances also require alternate means of egress from places of pupil occupancy through approved adjacent spaces.

b. The Commissioner of Education may at his discretion require two exits from individual rooms.

c. The Commissioner of Education may at his discretion require that certain stairways be equipped with enclosures to control the spread of fire and smoke.

d. The Commissioner of Education shall require that fire escapes be installed on school buildings when other exits are determined to be inadequate for fire safety. He shall approve the design of such escapes.

e. All pupil exterior exit doors shall swing outward and be equipped with panic hardware excepting a single door near grade level serving only one or two classrooms.

f. School buildings of ordinary wood construction shall not have places of assembly above the first floor.

g. School buildings of masonry exterior walls and wood interior construction shall not have places of assembly above the first floor. An exception may be granted if adequate exit facilities are provided.

h. Exit doors from places of assembly exceeding 1,800 square feet shall be equipped with antipanic hardware or have no locking devices.

i. Places of assembly exceeding 2,000 square feet as well as major exitways leading from such places of assembly shall be provided with emergency lighting systems.

j. School buildings from one to six classrooms shall be provided with exit signs showing the word "EXIT" in plainly legible letters not less than 4½ inches high and with the strokes of each letter not less than 3/4 inches wide. School buildings of seven classrooms or more shall be provided with illuminated signs showing the word "EXIT" as described above in auditoriums, assembly halls, gymnasiums, stairways, corridors, exits, and exitways.

k. Doors, walls, and ceilings of heater and fuel rooms shall be finished with fire resistive materials of at least 1 hour fire rating. For example: 2 x 4 stud partition finished on both sides with two layers of 3/8 inch gypsum board or 3/16 inch gypsum board over 3/8 inch gypsum board or 1/2 inch gypsum board with mineral wool batts between the studs.

l. Direct-fired heating units shall not be used in places of pupil occupancy.

m. Unused duct space shall be sealed off at each floor level with noncombustible material.

n. School buildings from one to six classrooms shall be equipped with either a manual (hand or electric) or automatic fire alarm system which is capable of being sounded for such a period of time to insure the evacuation of all occupants of the building. School buildings of seven classrooms or more or multistoried buildings shall be equipped with a manually operated or automatic fire alarm which will continue to sound the alarm until the tripped station has been restored to normal operation or has completed a cycle of not less than 30 seconds.

o. Every school building in any city, village, town, or fire district having a general fire alarm station and an electrically operated fire alarm system, shall be equipped with a municipal fire alarm box (located on the site or on the school building) of the same type and character used in such city, village, town, or fire district. Wherever practical, the internal fire alarm system of a school building shall be connected with the general fire alarm system so that the setting off of the school internal fire alarm system automatically gives the alarm to the fire department affording protection to the school.

p. All school buildings of two classrooms or more shall be equipped with a telephone for emergency use.

q. Combustible attic space and space under stairs shall not be used for storage.

r. All storerooms for flammable materials shall have walls, floors, and ceilings finished in noncombustible materials.

s. Exit doors shall not be locked, chained, or otherwise rendered inoperative from the inside at any time.

t. Corridors and passageways shall be kept clear at all times.

u. Wood floors shall not be treated or finished with oil. Floors previously so finished shall be cleaned with a penetrating seal.

v. The Commissioner of Education may at his discretion require that the doors, walls, and ceilings of exitways (corridors, stairwells, vestibules, lobbies, etc.) be finished with fire retardant materials or coatings.

w. Fire extinguishers shall be so located in corridors and in areas of unusual fire hazard that no point in such area or corridor is more than 100 feet from a fire extinguisher.

x. Hazardous glass areas adjacent to doors in exitways shall be protected by railings or grilles to prevent injury to pupils.

y. Every classroom, unless it has a direct exit to the outside, must be equipped with at least one window of such size and design to permit egress through such window.

z. Buildings of two stories or more of ordinary wood construction or with masonry exterior walls and wood interior construction shall have stairways equipped with enclosures to control the spread of smoke and fire or shall be provided with direct exits to the outside from each classroom. The doors to these stairways shall be designed to be kept normally closed and shall not be secured in the open position. All doors designed to be kept normally closed shall bear signs reading "Fire Door--Keep Door Closed" in letters not less than 3 inches high. However, stair enclosure doors may be held open if a release device is provided and so arranged that a detection of fire and/or smoke will cause an interruption of electric current and the doors will be released. The Commissioner of Education may in appropriate instances also require alternate means of egress from places of pupil occupancy through approved adjacent spaces. (Amended June 28, 1963. Effective September 1, 1965.)

2. The Commissioner of Education may designate an area or areas of a school building as unusable for pupil occupancy or may determine that an area or areas used for pupil occupancy may be occupied by only a certain number of pupils, when in his judgment the type, character, construction, age and general condition of the building, or any part thereof, or the location of the area or areas involved, indicate that it would be detrimental to the health and safety of pupils in relation to heating, lighting, ventilation, sanitation and health, and fire and accident protection to have such area or areas occupied by pupils or occupied by more than a certain number of pupils.

§ 168. Temporary school quarters

No temporary school quarters shall be used in school districts other than city school districts of cities having 125,000 inhabitants or more without the annual approval of the Commissioner of Education.

§ 169.

Every school building shall be provided with a supply of safe, potable water for drinking purposes dispensed within the building through approved sanitary drinking fountains and separate toilet rooms for boys and girls, with flush toilets and wash basins connected to an adequate water supply under pressure and a sewage disposal system if a public sewer is not available. No source of water supply nor sewage disposal system shall be used without the approval of the State Department of Health.

INFORMATION AND OPERATING PROCEDURES
REGARDING
TEMPORARY CLASSROOMS ON SCHOOL PROPERTY

Some school districts are confronted by situations in which available buildings are overcrowded and where it appears absolutely necessary to provide space and seats before additional permanent facilities can be secured.

While districts should always strive to construct permanent structures in order to ensure a healthful, safe, comfortable and adequate learning environment for children, it is recognized that children must be housed, and, therefore, the Education Department is willing to give consideration to facilities other than permanent when these are essential to meet real emergencies.

The following principles and operating procedures are provided to guide districts seeking approval of temporary structures in such situations.

I. Temporary Buildings as Personal Property

Temporary buildings are to be regarded as personal property under proper circumstances and not real property and thus may be placed upon school-owned land. This places temporary buildings in a similar category to computers that are rented temporarily.

The Division of Educational Facilities Planning shall approve the use of rented temporary structures (after approving the adequacy of the structures) under emergency conditions for not to exceed three years with contract providing for removal of buildings thereafter. Additional approval, at one-year intervals and not to exceed two years, may be granted upon the filing by the district of an acceptable explanation and application indicating progress toward a permanent structure, setting forth the reasons for requesting each additional year's approval and assurances that a satisfactory educational environment can be maintained in the school.

If approval is granted for a one or two-year extension of contract, the contract shall provide for removal of the buildings at the expiration of the contract.

Temporary structures must be cleared ahead of time with the Commissioner of Education through the Division of Educational Facilities Planning. School districts should not move in the direction of temporary buildings until district authorities contact the State Education Department. Temporary buildings must meet the same overall educational space, and health, comfort and safety requirements as permanent structures. This includes such related facilities as libraries, cafeterias, physical education requirements and special subject rooms.

The rental expenditures for temporary structures, approved in the manner outlined above, are approved operating expenses of the district.

II. Rental with Option to Buy

This procedure is purely a rental agreement with a clause in the contract providing the district with an option, which may or may not be exercised, to purchase the facilities. The qualified voters must authorize the board of education to exercise the option. Approval of the Commissioner of Education for the facilities must be obtained prior to use as well as prior to purchase.

The consideration paid to the vendor, if any, for the privilege of the option to buy must be nominal. Annual rental is considered to be an operating expense and the cost of purchase is a building expense.

Moreover, in the case of a rental agreement with option to buy, all requirements for permanent facilities must be met prior to the time of entering into the agreement.

If a district is scheduled for reorganization and if a rental with option to buy agreement is to be entered into, this is to be treated as a permanent structure, and, therefore, certification of apportionment of building aid is required.

III. Lease-Purchase

Section 416 of the Education Law permits a school district to purchase a building on an installment basis without the issuance of bonds providing that voter authorization is obtained in advance. It, therefore, appears that a district can enter into a lease-purchase agreement. The structure may be on land owned by the district or the lease-purchase agreement may include the purchase of land. Plans and specifications for such structures must be approved by the Commissioner of Education prior to entering into the agreement.

Such lease-purchase agreements must specify the portion of the annual cost which is rental and the portion which is the cost of erection (debt service -- principal and interest). That part of the annual cost which is debt service is considered to be building expense and that part which is annual rental is considered to be an operating expense of the district. In both instances these are subject to the appropriate state aid provisions of the Education Law.

If a district is scheduled for reorganization and if a lease-purchase agreement is contemplated or if an outright purchase is planned, this is to be treated as a permanent structure and, therefore, a certificate of compliance with Chapter 3602, subdivision 10, paragraph a (districts scheduled for reorganization) is required.

Lease-purchase agreements are to apply to buildings only. Purchase of materials and equipment must comply with Section 103 of the General Municipal Law.

APPENDIX IV a

THE ADVANCEMENT OF PLANS FOR MAJOR PROJECTS THROUGH THE DIVISION OF EDUCATIONAL FACILITIES PLANNING

The procedure outlined in this leaflet for the advancement of plans through the Division of Educational Facilities Planning is designed to achieve the following objectives:

1. That a careful and objective study of the school plant needs of the district be made, including selection of site.
2. That the building plans to meet these needs will contain suitable and adequate accommodations.
3. That the Board of Education will be informed as to the character and quality of the proposed building before it commits itself to the advancement of the project beyond preliminary plans.
4. That all elements entering into the cost of the project will be carefully studied and brought to the attention of the Board of Education before the people of the district are asked to appropriate funds for the project. This will include studies to select the proper materials which affect the cost of insurance and the cost of maintaining the structure during its lifetime.
5. That the final plans and specifications will receive the Commissioner's final approval with a minimum of delay and change.

School districts may be asked to work out a long-term budget which should include not only the new debt service but also any additional current expenses that will accrue. This budget should be prepared under the guidance of our Division of Educational Management Services. An anticipated tax rate for a five-year period will be ascertained. Districts having building projects are encouraged to take advantage of this type of service which the Division of Educational Management Services gives. A financial study will be required for districts whose share of the bonded indebtedness exceeds 10% of true valuation, and for these districts the approval of the Board of Regents is necessary. Districts should make a thorough check of bonding companies before making any commitments.

I. Study of School Plant Needs

After the Application for Examination and Approval of a School Site has been approved by the Division of Educational Facilities Planning, the local school officials and this Division should continue their cooperative study of the school plant needs, a study in which the selected architect or engineer should also participate. Later, the architect or engineer should present preliminary plan studies to the Division and the Board of Education at a joint meeting before asking the Board to approve his preliminary design. Such a joint review will avoid Division criticisms and objections to plans which have already been approved by the Board of Education.

From these studies and reviews will result the recommended room schedule and building program.

If the new construction is an alteration or addition to an existing building, an evaluation form (EFP-E) reporting on the construction and condition of the existing building must be made out. This should be done during the early stages of the preliminary drawings and submitted with the architect's or engineer's contract with the Board of Education, at about the same time as the first submission of preliminary drawings.

Applications to the Board of Regents for approval of bond issues (10% cases) should be submitted to the Education Department three weeks before the meeting of the Board of Regents. These meetings are usually the last Thursday and Friday of the month.

II. Preliminary Drawings

Based on the recommended building program the final preliminary drawings should be prepared by the architect or engineer and submitted in duplicate to the Division of Educational Facilities Planning for its examination, suggestions and approval. Important points to keep in mind are:

A. On plot plan sheet or first sheet showing floor plans show a miniature key plan of each floor of the building indicating the square footage and a summary of square footage computations. In the case of additions, plans and computations must be separate for the existing structure and the addition or additions.

B. Show square footage of all teaching stations in each such space.

C. Each space must be carefully labeled for its intended use as this has a direct relationship to the allowable pupil capacity; for instance, if the cafeteria is planned to accommodate students in a study hall situation, it should be labeled "cafeteria-study hall". Such dual use of space does in fact increase the rated capacity of a school.

D. Key letters, symbols or numerals referring to a table or list of spaces are not acceptable.

E. Scale of the drawings shall be not less than 1/16".

Revised or alternate submissions may be necessary before the final preliminary drawings are acceptable.

While the initial sketches may be drawn in single line and show only the main floor plans with a layout of rooms, the submission of preliminary drawings should also include:

1. A topographical map of the site showing:
    - (a) Orientation
    - (b) Existing and proposed contours at one-foot intervals
    - (c) Location of proposed new building (with possible extensions) and its relation to the present and future grade levels.
    - (d) Water, gas, electrical and sewage facilities or service connections
    - (e) General scheme of recreation facilities, primary landscaping features, walks, drives, parking areas
    - (f) Adjacent properties, buildings, streets, highways, etc.
    - (g) Location of test pits or borings
2. Plans of all floors, basement and roof. (For an addition, floor plans of the complete building with all spaces labeled as to activity and size shall be included. These may be at a small scale.)
3. Principal elevations and sections indicating the general character of the exterior and interior architectural design.
4. An outline specification. A form for the outline specification is part of the Application for Examination and Approval of Preliminary Plans (EFP-P).
5. A report on the findings from test pits or borings. This report should include cross sections of the pits or borings.
6. Reports of new construction materials and of new mechanical and electrical systems which are being contemplated or which are still in the experimental stage shall be submitted for study and for acceptance by this Division. Examples are: the flame spreads of, and smoke contributed by, new materials; the installation of electric heating and air conditioning systems; high temperature hot water systems; heat pumps; variations from regular methods of construction and systems.

When the preliminary drawings have reached an acceptable form the architect should then prepare his estimate of cost. This estimate shall relate not only to the cost of construction but also to all other items essential to the completion of the project, such as professional fees, equipment, site and site development, clerk of the works, etc. This estimate is a part of the Application for Examination and Approval of Preliminary Plans (EFP-P).

Two executed copies of the Application for Examination and Approval of Preliminary Plans (EFP-P)shall be filed with the submission of complete preliminary drawings. (Copies of this form amy be obtained from the Division of Educational Facilities Planning.)

For repair, replacements and minor alterations preliminary submissions are unnecessary. Only the final plans and specifications need to be submitted.

III. Unfinished Working Drawings

After preliminary drawings are approved and funds are available the Board of Education may direct the architect or engineer to proceed with the working drawings for the project.

Working drawings should be examined by the Division of Educational Facilities Planning while still unfinished so that details can be studied. Since architects and engineers vary in their methods, the particular time for this review and examination may very well vary with different architects and engineers for them to obtain maximum benefit. In general, though, the following items should be in advanced stages:

1. Topographical map of site showing orientation of building, as well as walks, fences, driveways, parking areas, bus garage location, proposed new contours and other features which are to be included within the principal construction contracts.
2. Basement, floor and roof plans showing the classrooms, the corridors (including stairs), exits, windows, doors (showing door swings), chalkboards, display boards, cabinets, lockers, wardrobes and instructional equipment. In the early development of final plans, floor plans and elevations at a scale of ¼" = 1'-0" should also be prepared and submitted for all classrooms both typical and special. These include science, homemaking, typing, office (or secretarial), music, art (or arts and crafts) rooms, industrial art and agricultural shops; also, administrative suites, health suites, auditoriums, and kitchen and locker rooms.
3. Elevations of all facades with pencil studies and detail drawings, and sections through the typical and important parts of the building to show the general character of the architectural design.
4. Mechanical drawings showing general design of all heating and ventilating, sanitary and electrical installations.

Any variation from the accepted preliminary drawings should be specifically mentioned in connection with this submission.

IV. Final Working Drawings and Specifications

Working drawings and specifications can now be completed and contract documents prepared. Working drawings and specifications should be submitted to the Division of Educational Facilities Planning in duplicate, with one set of drawings black on white, together with two copies of application (EFP-F) for the Commissioner's approval. Copies of this application may be obtained from the Division of Educational Facilities Planning.

It is important that the title of the project be the same on plans, specifications and application form, (EFP-F), so that the title on the Bond Certificate will be made out correctly. If the project is one of "Additions and Alterations" instead of an "Addition and Alteration" this should be clearly indicated in all titles so that the title on the Bond Certificate will be copies correctly and will provide the exact wording necessary to satisfy legal requirements.

In the submission of final plans these items should also be kept in mind:

A. Maximum size of prints shall not exceed 36" x 48:.

B. Leave a bordered blank space not less than 5" high and 7" long on the plot plan sheet or the first sheet showing floor plans. This space will be for the use of this Division and should be directly above or to one side of the title block.

C. On plot plan sheet or first sheet showing floor plans include a miniature key plan of each floor of the building indicating the square footage computations. (In the case of school additions plans and computations must be separate for the existing structure and the addition or additions; the gross square footage of the existing structure must be indicated).

D. Show square footage of all teaching stations in each such space.

E. The labeling of spaces on the floor plans should correspond with the approved preliminary plans. If a change has been made this should be noted in a letter accompanying the application.

F. Each specification cover sheet and each sheet of the drawings must bear the seal and signature of the architect or engineer.

Ordinarily this Division will need three or four weeks for the processing of working drawing and specifications. We recommend a minimum of 30 days for this Division's review and another 30 days for the contractors to prepare bids.

These final submissions should contain copies of all drawings including plot plan, floor plans, elevations, sections, and details; also, all mechanical and electrical work with the utility services clearly indicated.

IV a

In the case of an independent sewage disposal system, the approval of the plans for the proposed system by the State Department of Health is required before the approval of the Commissioner of Education covering the entire project can be issued. This requirement applies both to a new building and to an addition which increases either the pupil capacity of the building or the number of sanitary fixtures. Health Department approval of swimming pools is also required. The architect or engineer should get in touch with the local sanitary engineers of the State Health Department early in the advancement of his plans. We recommend a minimum of 30 days for the State Health Department review and another 30 days for the contractors to prepare bids.

Approval by the Air Pollution Control Board, a division of the State Health Department, is also necessary on projects containing boilers with a rated input capacity of one million BTU's per hour, or more, and for any kind of incinerator before the Commissioner's approval can be given. An application together with plans and specifications covering the heating and incinerating design should be sent to the appropriate State Health Department Agency before the final plans and specifications and the Application for Examination and Approval of Final Plans and Specifications (EFP-F) is sent to the Division of Educational Facilities Planning. Not until this Division receives notice from the State Health Department of their acceptance of the heating and incinerating design can final approval be given by the Commissioner of Education.

This applies to any other type of installation capable of polluting the atmosphere. The installation of a spray booth in a vocational shop, for example, will also require the approval of the State Health Department.

Later, when the Certificate of Completion and Acceptance of Building (EFP-CC) is sent to this Division, it should be accompanied by a final approval given the owner by the State Health Department after operating tests have proven the new installation meets smoke pollution standards.

Copies of all plans and specifications, applications, evaluation forms, reports, etc. which are submitted by the architect or engineer to the Division of Educational Facilities Planning should be filed with the Board of Education and superintendent or district superintendent of schools.

Contracts shall not be let nor work begun until plans and specifications have been approved by the Commissioner of Education as required under Section 408 of the Education Law.

COMPLETE LIST OF FORMS REQUIRED ON EACH PROJECT

1. Application For Examination and Approval of a School Site	EFP-S
2. Architect's Contract	
3. Evaluation Form (On Existing Buildings)	EFP-E

4.	Application for Examination and Approval of Preliminary Plans	EFP-P
5.	Application for Examination and Approval of Final Plans and Specifications.	EFP-F
6.	Supplemental Cost Data*	EFP-C
7.	Addenda and Change Orders	
8.	Certificate of Completion and Acceptance of Building	EFP-CC

*Supplemental Cost Data (EFP-C)

Copies of this form will be sent to the district with the Commissioner's approval of the final plans and specifications.

On one copy of the four forms sent will be listed the rated capacity as computed by the Division of Educational Facilities Planning. Upon this rated capacity will be computed the amount of State Aid.

On new buildings (but not new buildings built as additions to existing units) the architect is required to complete these forms and distribute them according to the instructions given in the form heading. The rated capacity, as computed by this Division, should be shown on all the forms; also, the areas of the multi-purpose, shower-locker rooms and of the auditorium and gymnasium as called for on the last page. From the form returned to this Division will come some of the statistical reports mandated by the Legislature or reported to the Federal Government as well as the construction data sheets sent to school boards, architects and engineers. This form should be completed and returned within two weeks after the contracts are signed so that the processing of State Aid will not be delayed.

For additions, alterations and separate site projects, a letter from either the Board of Education or the architect is required indicating that contracts have been signed, and listing the dates and amounts of the contracts together with the accepted alternates.

SUBMISSION OF PLANS AND SPECIFICATIONS FOR SMALL PROJECTS

To expedite the advancement of small projects (usually repairs, replacements, and alterations) on which the Commissioner's approval is necessary, the information given here should be found helpful.

For some of the smaller projects plans need be only simple pencil sketches drawn to scale and the specifications only a brief description of the work to be done and the materials to be used. In some instances no plans will be necessary, - just a specification, or even a catalog description.

It is important to bear in mind that plans and specifications (when required) must be submitted in duplicate with one set of plans black on white. Cover sheets of each specification and each drawing sheet must be sealed and signed by the architect or engineer. This material shall be accompanied by two executed copies of an Application for Examination and Approval of Final Plans and Specifications (Form (EFP-F). Copies of this form may be secured from the Division of Educational Facilities Planning.

This approval form, EFP-F, was designed primarily for major projects. Fill in only the blanks which are applicable to your project. Be sure that all financial information requested is given, and that the application is signed by the board president (chairman of board of trustees or sole trustee) and by the Superintendent (city, village or district), and signed and sealed by the architect or engineer.

Prepare five copies of the application form. Keep one for the district's files, send one to the (district) superintendent, submit two to the Division of Educational Facilities Planning, and keep one for the architect or engineer, if any. (In cities and village superintendencies, four copies only will be needed, one for the superintendent, two for the Division of Educational Facilities Planning, and one for the architect.)

Section 408 of the Education Law and rulings of the Commissioner provide that plans and specifications for all school building projects costing $100,000 or more must be approved by the Commissioner of Education.* This section of the law does not apply to cities over 125,000. (See Pages A-19 & A-22)

According to Section 7307 of the Education Law an architect or engineer is not required for structures costing less than $10,000 unless structural or public safety is involved. Projects that involve safety must meet the Division's safety standards as outlined in Section 409 of the Education Law.

Again, make sure that the application, plans and specifications are submitted in duplicate, with one set of plans black on white.

If the project is to be done by contract and involves an expenditure of more than $2,500, the contract must be awarded to the lowest responsible bidder.

All purchase contracts involving an expenditure of more than $1,000 must be awarded to the lowest responsible bidder (article 5A, section 103, paragraph 1, General Municipal Law).

* Projects estimated at $10,000., or more, currently require review.

APPENDIX IV b

METHOD OF COMPUTING SQUARE FOOTAGE, CUBAGE AND PERIMETER

Square Footage

1. All horizontal areas shall be measured from the outside face of the enclosing walls at the plane of the floor.

2. Each floor of a multistory building shall be included in the square foot calculations, including stairways and developed basement areas.

3. Uncovered steps, eaves, approaches, buttresses, parapets, light courts, window areas, pipe trenches, cisterns, septic tanks and retaining walls shall not be calculated nor included.

4. In computing square footage the following areas shall be included as one-half of the actual areas: (a) porticos; (b) bicycle sheds; (c) porches; (d) open, covered play areas and passages; and (e) sheltered bus loading platforms.

Cubage

1. The height of the principal stories shall be measured from a horizontal plane two feet below the surface of the finished floor of the first story (in all cases including slab on ground) to the following point of different roof types.

   a. Flat roofs--to the high point of the finished roof area.
   b. Sloping ridge roofs--to a horizontal plane at the mean height (the midpoint between the eaves and ridge) of the sloping roof.
   c. Sloping roofs with deck--to the underside of the ceiling. The actual volume of the roof section above the plane of the ceiling should then be included.

2. The height of developed basement areas shall be measured from the surface of the finished basement floor to a horizontal plane two feet below the surface of the finished floor of the first story. (A developed basement area is defined as one having a 7'-0" clear ceiling height and a finished floor.)

3. Other spaces:

   a. The actual volume of towers, boiler stacks and hoist shafts shall be obtained.
   b. The actual volume of (1) porticos, (2) bicycle sheds, (3) porches, (4) open, covered play areas and passages, and (5) sheltered bus loading platforms shall be obtained.

Only one-half of this volume shall be included in computing the total cubage of the building.

Perimeter:

To obtain building exterior perimeter take perimeter of all floors, including enclosing walls of finished basements: include courts, wall extensions, piers, etc. Example: Four floors and finished basement will give five perimeters.

APPENDIX IV c

FIRE ESCAPES AND STAIR TOWERS FOR EXISTING SCHOOLS

Authorization

The Regulations of the Commissioner of Education, section 167, provides for the installation of fire escapes on existing buildings:

> "Exterior fire escapes shall be installed when required by the Commissioner of Education and all details of their design shall be approved by the Commissioner of Education."

Definition

A fire escape is assumed to be an emergency exit leading from a floor or floors more than four feet above grade, not necessarily fully enclosed nor heated. For the purposes of this leaflet a stair tower is an enclosed fire escape. It should not be used as an entrance to a school building.

General

Additional stair towers or fire escapes are often necessary to correct hazardous conditions which have developed or have become evident since the original construction of the building. A building considered fire-safe when built years ago is not necessarily considered fire-safe today. Changes in the use of the building and research and experience in fire safety point out conditions which were not apparent before. Two of the major hazardous conditions are:

1. Insufficient stairs for the capacity of the floors
2. Corridors without exits adjacent to each end (dead end)

Experience has indicated open fire escapes are not always usable particularly during the winter months. They are also subject to vandalism and present an attractive hazard to children. To provide adequate protection it is strongly recommended that, where needed, permanent additional stair towers be constructed which will become an integral part of the building. If this is not possible, an approved type of fire escape may be erected.

Location

Stair towers or fire escapes shall be planned to relieve dead-end conditions, provide sufficient units of exit width and have a minimum exposure to existing window and door openings. The stair tower or fire escape shall be continuous and unobstructed and may cross a roof if provided with fully enclosed fire-resistive walkways.

Material

All stair towers and fire escapes shall be constructed with noncombustible materials. Wood may be used on fire escapes for temporary quarters.

Structural Design

All stair towers and fire escapes shall be self-supporting and designed in accordance with current applicable standards and practices:

Loading

Platforms and landings	100 pounds per square foot
Treads	100 pounds per linear foot

Sizes and Dimensions

Stair width	-- 30 inches minimum
Headroom	-- 7 feet 6 inches minimum
Tread	-- 9 inches minimum and skid resistant
Riser	-- 7 inches maximum
Handrails	-- 30 inches maximum above nosing and continuous
Doors	-- As wide as stairs and 6 foot minimum height
Door Sills	-- To be at least 3 inches but no more than 6 inches above platform
Platforms	-- To be as wide as stairs. The length shall be at least twice the width of stairs or exit door.
Risers	-- In one flight--3 minimum, 18 maximum

Hardware

Door serving single room--classroom hardware

Door serving two or more classrooms or places of assembly--antipanic hardware.

Glass

All glass areas below fire escapes or within five feet of fire escapes in a horizontal direction shall be of wire glass.

All platforms of stair towers shall have fenestration.

Enclosures

It is required that fire escapes be protected from the weather by a canopy and enclosed on all sides to a height of not less than 5 feet as measured from the nose of a tread. The enclosing material shall be securely attached to the supporting framework. It is recommended that the enclosure be weathertight and equipped at the bottom with antipanic hardware which cannot be opened from the outside.

Signs and Lighting

Exit lighting or signs shall be provided to designate the exit to a fire escape or stair tower.

Stair towers shall be provided with lights at each landing and change in direction.

Maintenance

The stair tower or fire escape shall be maintained to insure safe exits at all times.

Approval of Plans

All plans for fire escapes and fire towers shall be submitted to the Commissioner of Education for approval of design, location and materials.

APPENDIX IV d

Competitive Bidding and Awards

It has been evident for some time that there might be more standardization in the writing of the specifications which would permit competitive bidding and at the same time allow the owner and the owner's representatives to have a freedom of choice of certain materials and equipment items. In order to stay within the limits provided by law, frequently it has been felt necessary to use an "or equal" clause throughout the specifications instead of utilizing a single "equivalency clause".

The following has been prepared through the joint efforts of the school committee of the AIA, a group of representative engineers doing school work, the Legal Division and the Division of Educational Facilities Planning of the State Education Department. This material is offered as an aid for the writing of specifications.

Equivalents

A. Architects and engineers as professional advisors and agents of the Owner (the School District), should select the materials and methods of construction and engineering systems and devices best suited to the Owner's purpose and program. However, the bidding procedure should not deprive the owner of his right of choice of certain materials and items of equipment.

Since many items of mechanical equipment must operate for years after installation, there are certain intangibles which cannot be specified but are important; for example, reliability of service.

B. Essentially, the "closed base bid" specification wherein one and only one item is specified is a specification that is not acceptable for public works, i.e., public school construction. A wholly "open bid" specification is probably too loose and too indefinite, since it is a performance type specification being used to indicate the standard of quality desired but does not necessarily result in the lowest price to the owner. In the "bidders-choice bid" specification with three or more brand names specified, the requirement for competitive bidding is not met. The "base bid" type of specification has been most commonly used in the specifications offered by architects and engineers on public school construction for approval by the Commissioner of Education. Simply stated, whenever "base bid" specifications are submitted the words "or equal" necessarily must follow the words "base bid". Whenever a brand name or manufacturer is named in the Base Bid specification, it indicates the standard of quality desired.

Contractors may submit bids on the stated Base Bid, that is, on the standard of quality of the materials, products or equipment desired, or contractors may submit an Equivalent Bid for "or equal" items. The equivalency of such items is to be judged by the architect or engineer whenever offered by bidders as equivalent to the base bid items and so reported to the Board of Education for its ultimate decision.

C. If instead of a "base bid" specification with the repetition of the words "or equal" throughout it is determined to provide an equivalency clause, the following is one form which might be used:

> "EQUIVALENTS: Where, in these specifications, one certain kind, type, brand or manufacture of material is named, it shall be regarded as the required standard of quality. Where two or more are named these are presumed to be equal, and the Contractor may select one of those items. If the Contractor desires to use any other kind, type, brand or manufacture of material than those named in the specifications, he shall indicate on a Substitution Sheet what material, equipment or method is offered as equal and when requested, submit information describing wherein it differs from base specifications in specific detail and other information as required by the Owner."

Award of Contracts

If alternates are included in the bidding and accepted, the award is to be made to the lowest responsible bidder on the basis of his base bid and accepted alternates. The Award of Contract shall be made to the lowest responsible bidder under the Base Bid items specified or to the lowest responsible bidder under the Equivalent Bid items specified, whichever is the lowest. The acceptable standard of quality of all equivalent items shall be determined by the architect with the burden of proof of the equivalency of such items a responsibility of the bidders.

The Owner or his representative shall investigate the lowest bidder in order to determine his responsibility.

> "Or Equal" clause for competitive bidding must be stated (or restated) in a general clause under general conditions in order to allow for substitutions for those base bid items mentioned by name, brand, or manufacturer throughout the specifications. Provision must also be made for consideration of such substitutions in the award of the contract. (Our legal division has indicated that wherever no substitutions are allowed for base bid items, such specifications do not meet the requirements of the Commissioner of Education for competitive bidding.)"

Example of non-collusive bidding certification required with all bids:

NON-COLLUSIVE BIDDING CERTIFICATION

"By submission of this bid or proposal, the bidder certifies that: (a) This bid or proposal has been independently arrived at without collusion with any other bidder or with any competitor or potential competitor; (b) This bid or proposal has not been knowingly disclosed and will not be knowingly disclosed, prior to the opening of bids or proposals for this project, to any other bidder, competitor or potential competitor; (c) No attempt has been or will be made to induce any other person, partnership or corporation to submit or not to submit a bid or proposal; (d) The person signing this bid or proposal certifies that he has fully informed himself regarding the accuracy of the statements contained in this certification, and under the penalties of perjury, affirms the truth thereof, such penalties being applicable to the bidder as well as to the person signing in its behalf; (e) That attached hereto (if a corporate bidder) is a certified copy of resolution authorizing the execution of this certificate by the signator of this bid or proposal in behalf of the corporate bidder."

APPENDIX IVe

Bus Garage Recommendations(IVe)

1. SITE DEVELOPMENT

A. Construction of school bus garage facilities is recommended to be on a site separate from a school building site or, if on the same site, as remote from a school building as possible.

1. If on the same site, in addition to the above;

   a. The garage shall not be attached to a school building.
   b. Bus circulation shall not interfere with safety of pedestrian traffic and access to play areas, or with future building expansion. Bus driveway shall not encircle school buildings.
   c. Public and staff parking shall not interfere with free movement of buses.

B. Sites with steep slopes should be avoided. A ten (10) percent slope is the maximum for vehicular traffic.

C. Paving Materials (such as blacktop and concrete) should provide a hard, dry, non-slippery surface. State and county highway specifications may be used for guidance.

1. Drives generally should be 12 feet wide; 20 feet wide if vehicles pass. Drives should be as short and direct as possible in consideration of initial cost, snow removal and maintenance.

2. Turning circle in front of garage doors should be a minimum of 90 feet diameter; 110 feet diameter is recommended.

3. Lanes and parking areas should be designated with appropriate signs and lines to provide safe and unrestricted bus circulation.

4. Parking area for driver's and mechanic's vehicles should be provided, and at such locations which avoid interference with bus circulation.

D. Landscaping and planting should not restrict vision along drives nor at intersections, nor should it affect snow removal by being too close to the driveway.

E. Gas Pump Installations should be in a safe, accessible location, preferably remote from the garage building, and well protected from physical damage. Gasoline storage tanks should not be located under drives.

1. Blacktop paving deteriorates when subjected to spilled gasoline. Concrete or gravel should be considered in such locations.

2. DESIGN AND CONSTRUCTION

A. General: School bus garages should be designed and constructed to properly house the school district's current bus program and to facilitate future expansion and to afford adequate safety to all occupants of the facility. School districts are urged to avail themselves of the inspection services of all New York State agencies with regard to equipping, arranging, operating and maintaining the facility to reasonably and adequately protect the lives, health and safety of all persons using the facility.

1. Tandem stall layout should be considered if there are over seven stalls.

2. Design should consider office space, drivers room, lavatory and toilet facilities for drivers and mechanics, as well as shower facilities for the mechanics. The possibility of women drivers should also be considered.

B. Bus Stalls: Depth of bus stalls should be a minimum of 40 feet clear, inside; 78 feet clear if in tandem.

1. Storage stalls of 12 feet width are generally found to be satisfactory.

2. Repair and wash stalls should be provided.
   a. Repair stalls should be a minimum of 16 feet wide(to facilitate pulling axles)by 50 feet long.

   b. Repair stalls should be provided with at least 10 lineal feet of work bench and tool racks.

3. Storage areas for maintenance and repair items should be located convenient to maintenance facilities.

C. Exits: A minimum of two exits, remote from each other, shall be provided from each general area.

1. Distance of travel to an exit shall not exceed 150 feet.

2. Doors at required exits shall swing in the direction of egress and shall be equipped with hardware which is always operable from within the building.

3. Door width at required exits shall be a minimum of 36 inches. A pass(wicket)door in an overhead door may be approved as one of the required exits.

4. Exits shall be unobstructed, with a 36 inch minimum clear passageway width.

D. Walls, Partitions and Roof Construction are recommended to be of fire resistive material; however, serviceable facilities have been built of wood frame construction, pole barn construction and with wood roof. A detailed economic study considering construction, initial costs, operation costs, maintenance, depreciation, insurance, etc. should indicate a suitable type of construction.

1. Bus service (repair) areas shall be separated from bus storage areas by two hour fire-rated construction, with self-closing Class B, fire-rated doors and frames.

2. Overhead construction and/or ceilings should be finished with reflective, light colors.

E. Storage Rooms for flammable materials and heater rooms required by section 3-B-1, shall have walls and floor (and ceilings, if there is usable space above) of at least two hour fire-rated construction, with self-closing, Class B fire-rated interior doors and frames. Duct and grille openings shall be provided with fusible link fire dampers.

1. Doors of heater rooms should open directly to the exterior.

2. Combined storage and heater rooms are not recommended; however, in no case shall storage occur within four feet of the heating unit burner side, nor within 1'-6" from the other sides of the heating unit.

F. Floor Surface should be hard, dry, non-slippery, nondusting, low in maintenance and properly pitched to drain.

1. Concrete floors should be designed to withstand the applied loads and serious consideration should be given to the location of expansion and contraction construction joints. Surfaces shall be treated with curing or sealing compounds to diminish dusting. Painting of concrete floors is seldom necessary.

G. Toilet and Wash Facilities: Separate toilet room shall be provided for each sex (if both men and women will be in garage) with no direct connection between the rooms. A minimum of one lavatory shall be provided in the toilet room for each water closet unless washing facilities are provided in the work area in proximity to the toilet room(s).

1. Construction shall be solid from floor to ceiling, minimum clear height 7'-6" with top ceiled over.

   a. Walls, ceilings and compartment partitions shall be of non-absorbent material, or finished with light-colored water-repellent paint.

   b. Floor and base shall be of non-absorbent material. Base shall be 6" minimum height, coved at the bottom.

c. Doors shall be unglazed, self-closing, with lock or latch, and hung so as to screen the interior from view.

d. Water closets shall be enclosed in individual compartments if there are more than one, or if a water closet and one or more urinals.

H. Dual-post Hydraulic Lift of 10 ton minimum capacity should be provided in a repair stall. Clear height above the lift must be increased over normal roof height - usually 4'-6" +.

1. Grease pits are less desirable than hydraulic lifts and are not common to new bus garage construction. However, if used, a grease pit should be 4 feet in depth, 40 feet minimum in length, 3'-6" minimum in width between side walls, and have both ends rounded. Pits should be protected by a 6 inch high concrete or steel curb around the perimeter, and equipped with adequate remote stairs. Recessed storage facilities should be provided at pit floor level. Pits should also be provided with a drain, or sump and sump pump.

I. An Overhead Track and chain hoist assembly of one ton minimum capacity should be considered at the repair stall to facilitate pulling motors.

J. Open-sided Floor Areas more than four feet above the main floor shall have the open sides guarded by 42 inch(minimum)high railings. Permanent stairs or a ladder shall be provided to reach the upper level.

1. Exterior wall door openings four feet or more above grade shall be protected by railings.

2. Stairs shall be guarded on open sides by railings.

3. Stairs shall have non-slip treads.

K. Overhead Doors are recommended to be a minimum of 12 feet high. An 11 foot width is recommended. Double width doors(20 foot minimum) should also be considered.

1. Overhead doors should be glazed with clear wire glass at eye level.

2. Bumpers or wheel guards at door jambs are desirable, but not essential. Guards at free standing interior columns are essential.

L. Fire Extinguishers shall be provided, - a minimum of one for each repair stall and one for each four storage stalls, all suitable for Class B and C fires.

1. Extinguishers shall be located remote from each other and in proximity to service area exits and adjacent to high hazard areas.

M. Spray Painting facilities in a bus garage should generally be restricted to infrequent "touch up" work. Such work does not generally constitute a health hazard and the small amounts of flammable liquid materials stored and used generally do not produce an uncommon fire hazard. The spray operator must, however, use personal respiratory protective equipment of a type specifically designed for paint spraying.

Materials and/or methods which produce dangerous air contamination should be avoided. Large-scale painting operations usually produce dangerous air contamination which must be controlled or removed. Special provisions required to protect health and to provide fire safety result in costly installations. This dictates that ONLY those districts whose bus operation is large enough to warrant the additional costs should consider complete spray painting facilities. Specific requirements for complete spray painting facilities may be obtained from the Division of Educational Facilities Planning.

1. Storage of flammable liquids and application of same shall be in rooms of fire-rated construction as required by section 2.E.

2. Fire extinguishers as required by section 2.L shall be provided at exits of rooms used for storage, and for application of flammable liquids.

N. Engine Heaters: Enclosed bus storage stalls generally prevent vandalism and theft, eliminate cold motors with associated hard starting and excessive wear, and reduce body deterioration from the corrosive effects of rain, wind, snow and especially, sun. However, engine heaters have been satisfactorily used by some districts in lieu of enclosed bus storage facilities.

1. Engine heaters are generally of two types.

   a. Electrically operated, thermostatically controlled external type heaters which when connected in series with the engine cooling system, circulate the coolant by gravity through the engine block. Integral pumps are available for positive forced circulation.

   b. Circulated anti-freeze. A remote reservoir of anti-freeze is heated(by gas or oil)and pumped through a piped system. Branch lines couple to the individual vehicles.

3. MECHANICAL

A. Plumbing:

1. All plumbing work shall be in accord with A.S.A. A.40.7, American Standard Plumbing Code.

2. Toilet and wash facilities shall be provided for drivers and mechanics. See section 2.F.

3. A supply of drinking water shall be provided. Use of drinking fountains is recommended. Use of disposable paper cups, etc. is acceptable. Use of a common cup, etc. is prohibited.

4. Water supply and sewage system shall be approved by the New York State Department of Health.

5. Hot and cold water should be provided at wash stalls, preferably through mixing-type hose bibs.

   a. Detergent dispensing systems are available for consideration of use.

6. A cold water hose bib should be provided for each two storage stalls.

7. Floor drains should be provided: 1 for each storage stall and each repair stall, 2 for each wash stall. A continuous gutter can be used in lieu of the above.

   a. Grease traps should be installed in floor drain lines connecting to sanitary or municipal drainage systems.

   b. Flammable liquids shall be prevented from entering the building drainage system.

3. B. Heating: The heating system should maintain 60 degrees, F., minimum, in repair and toilet areas. Bus storage areas need only to be maintained above freezing. All controls and accessories necessary to insure safe operation shall be included in the system, including all primary controls on a 120 volt, grounded circuit. Installation shall be in accord with requirements of the National Board of Fire Underwriters.

1. Heating units, burning fuel, having an individual or combined rated gross capacity in excess of 250 mbh. and operating at 15 psi. pressure or less shall be enclosed in two-hour construction. See section 2.E. Enclosure of all heating units is recommended.

2. Direct fired unit heaters(space heaters)may be used without enclosures if openings for air in the heater which come in contact with the flame, and the flame proper, are at least 8 feet above the floor.

3. Where the heating system includes a boiler*, the construction, installation, operation and maintenance of such boiler and supplemental equipment shall comply with the provisions of Title 12 of the New York State Official Compilation of Codes, Rules and Regulations, Part 4(12 NYCRR4), to adequately protect the life, health and safety of persons frequenting the facility.

   * The term "boiler" as defined by 12 NYCRR4

4. Areas for storage of flammable liquids and for application of same(see section 2-M)shall be heated only by wet system radiation, or indirect forced warm air.

C. Ventilation shall be provided to reduce air contamination to safe levels and to provide an acceptable environment. General ventilation may be by infiltration and gravity exhaust or by mechanical systems where positive circulation is desired.

1. Toilet rooms shall be ventilated. A window opening to the exterior is acceptable at a rate of one square foot of openable area for each water closet. Mechanical ventilation is acceptable at a rate of 35 cfm for each water closet, with positive means of intake air.

2. Motor vehicle fumes shall be exhausted at each servicing location by a duct or 3" minimum diameter flexible pipe, fitting tightly over the tail pipe and/or deflector, which discharges outdoors at a minimum rate of 100 cfm. Total capacity for a system shall be based on the total number of branch ducts; except that, where there are over four branches, and each branch has automatic closing caps, additional capacity may be based on 50% of the number of branches over four.

a. Where there are no more than four servicing locations, a gas tight duct or flexible pipe of a diameter at least equal to the tail pipe, fitting tightly over the tail pipe, may be used providing the duct length shall not exceed 20 feet to termination outside.

3. Welding, flame cutting, etc. shall be provided with local exhaust ventilation to maintain at least 50 fpm. velocity in the breathing zone of the operator, or 100 fpm. air flow at the welding arc, etc. toward a fixed or movable hood which discharges outside.

   a. Proper goggles or shields must be worn when performing the above operations.

3. D. Electric:

1. All electric work shall be in accord with the National Electric Code.

2. Electric service should be 220 volt with a minimum 100 amp entrance switch. Three phase service should be considered if available.

3. Permanent electric installations four feet or less above the floor shall be explosion proof. Installations above 4 feet need not be explosion proof, except as below.

   a. Electric wiring and equipment in rooms used for storage of flammable liquids, and within 20 feet of work areas used for the application of same, shall be in sealed, rigid metal conduit with explosion proof fittings.

   b. Electric lighting in storage rooms and work areas as in 3.a. above, shall be totally enclosed types and protected against breakage. Lamp sockets shall be non-metallic and of the switchless type.

   c. Switches, other than explosion proof type, shall be at least 20 feet from work areas for the application of flammable liquids and outside storage rooms for same.

4. A duplex outlet should be provided for each repair stall; for each two bus storage stalls.

5. Flexible electric cords shall be three conductor, extra heavy service type, insulated and grounded.

6. Lighting should be provided to illuminate all areas during working hours.

   a. Lighting in bus storage areas should be over the aisles between buses.

b. Properly placed lighting in service areas, (such as industrial type fluorescents) will be advantageous; however, supplemental portable lighting will be necessary. Portable lighting shall be protected from breakage.

c. Exterior flood lighting to discourage vandalism should be considered.

7. Exit lights shall be installed at all required exit doors. Exit lights should be on a separate circuit energized on the service side of the main distribution panel.

APPENDIX V

REFERENCE PUBLICATIONS

Pamphlets

1. Designing the School Plant as a Community Center
2. Heating and Ventilating Recommendations for New York State Schools
3. Planning the School Health Suite
4. Planning the Elementary School Plant
5. Planning Building Facilities for Vocational Agriculture
6. Planning the Central School Library
7. Planning the Indoor Physical Education Facilities
8. Planning Schools for Use of Audio-Visual Instructional Material
9. Planning the Music Suite
10. Planning the Outdoor Physical Education Facilities
11. Sanitary Facilities in School Buildings
12. Planning for Safety in School Buildings
13. Visual Comfort and Efficiency in School Buildings (Discontinued Temporarily)
14. School Site and Development of School Grounds
15. Planning the School Auditorium
16. Planning the School Lunchroom
17. School Building Projects, A Guide to Administrative Procedures
18. A Planning Guide for Vocational-Industrial Technical Building Facilities for Comprehensive High Schools
19. Planning the Science Facilities for Central Schools
20. Planning and Equipping the Homemaking Department
21. Planning the Art Room for Secondary Schools
23. Planning Facilities to Accommodate Adult Education

Other Material

A. Certificate of Completion and Acceptance
B. Check List to Accompany Preliminary Plan Approval
C. Evaluation of Existing Buildings
D. School Lighting Standards
E. Notes on Heating and Ventilation Regulations
F. Planning for Mechanical Safety in Schools
G. Planning the School Guidance Facilities
H. Recommendations for Temporary Quarters
I. Report on Proposed School Site
J. School Building Requirements
K. School Site Standards

APPENDIX VI

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   Reinhold Book Division, 430 Park Avenue, New York 22, New York

9. Plastic Design of Steel Frames
   By Lynn S. Beedle
   John Wiley & Sons, New York, New York

10. Building Design Data (Looseleaf Booklet)
    United States Steel, Pittsburgh, Pennsylvania

11. Steel Gables and Arches
    American Institute of Steel Construction
    New York, New York

12. Plywood; Properties, Design and Construction
    By Nelson S. Perkins, C.E.
    Douglas Fir Plywood Association, Tacoma, Washington

Design - Mechanical and Electrical

ASHRAE (American Society Heating, Refrigeration, Air-Conditioning Engineering) Guide; 354 East 47th Street, New York 17, New York.

IES Lighting Handbook; Illuminating Engineering Society, 1860 Broadway, New York 23, New York

Source Book of Community Water System
By Joseph S. Ameen, S.M.
Technical Proceedings, High Point, North Carolina

Fire Safety

1. School Fires - Prevention, Control, Protection.
   OE-21017, Bulletin 1962, No. 6
   Superintendent of Documents, Washington 25, D.C.

2. Operation School Burning
   National Fire Protection Association
   60 Batterymarch Street
   Boston 10, Massachusetts

3. Operation School Burning No. 2
   National Fire Protection Association
   60 Batterymarch Street, Boston 10, Massachusetts

4. Is Your Student Housing Fire Safe?
   Federation of Mutual Fire Insurance Companies
   20 N. Wacker Drive, Chicago 6, Illinois

5. School Fires - An Approach to Life Safety
   Printing and Publishing Office, National Academy of Sciences - National Research Council, 2101 Constitution Avenue, Washington 25, D.C.

6. A School Fire Safety Guide
   Great Neck Public Schools, Great Neck, New York

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Note: When plans and specifications have reached their final stages, tentative fire insurance rates may be obtained from the New York Fire Insurance Rating Organization at any one of the following addresses:

55 Grant Avenue, Albany, New York 12206
266 Pearl Street, Buffalo, New York 14202
85 John Street, New York, New York 10038
25 North Street, Rochester, New York 14604
817 East Willow Street, Syracuse, New York 13203

General

1. Generally Accepted Standards Applicable to State Building Construction Code, Latest Edition, Division of Housing and Community Renewal, 270 Broadway, New York, New York.

2. Public Construction Contracts and the Law
   By Henry A. Cohen
   F. W. Dodge Corporation, New York, New York

3. Publications of BRI,
   By Building Research Institute
   1725 DeSales Street, N.W., Washington, D.C.

4. Publications and Transactions of ASCE
   American Society of Civil Engineers
   345 E. 47th Street
   New York, New York

5. The Critical Path (Construction Scheduling Method)
   By General Electric Company, Schenectady, New York

Materials

1. Technical Data on Plastics
   Manufacturing Chemists' Association, Inc.
   1625 Eye Street, N.W., Washington 6, D.C.

2. Publications of Portland Cement Association
   33 W. Grand Avenue, Chicago 10, Illinois

3. Publications of Asphalt Institute,
   College Park, Maryland

4. Publications of ACI (American Concrete Institute)
   P. O. Box 4754, Redford Station, Detroit 19, Michigan

APPENDIX VII

PROVIDING FOR THE PHYSICALLY HANDICAPPED⊛

a. Some of the more important items to keep in mind in designing for the convenience of the physically handicapped are:

1. At least one entrance shall be a level entrance with no stairs in the approaches from a parking area or from the public sidewalk. Parking should be conveniently near.

2. Walks should be at least 48" wide and not have a gradient greater than 5 per cent.

3. Ramps shall have non-slip surfaces, not more than 1 foot rise in 12 feet, and handrails 32" high from surface of ramp on at least one side (preferably two sides) that extend 1 foot beyond top and bottom of ramp.

4. Doors shall have a clear opening of no less than 32 inches when open and shall be operable by a single effort.

5. Toilet rooms shall have one toilet stall that is at least -

    - 3 ft. wide,
    - 4'8" to 5'-0" deep,
    - a door 32" wide and swinging out,
    - handrails on each side of stall, 33 inches high and parallel to the floor, 1½ inches in outside diameter, with 1½ inches clearance between rail and wall, and fastened securely at ends and center,
    - a water closet with the seat 20 inches from the floor.

6. Toilet rooms shall have lavatories with narrow aprons, which when mounted at standard height are usable by individuals in wheelchairs.

    - some mirrors and shelves shall be provided above lavatories at a height as low as possible and no higher than 40 inches above the floor, measured from the top of the shelf and the bottom of the mirror,
    - toilet rooms for men shall have wall mounted urinals with the opening of the basin 19 inches from the floor, or shall have floor-mounted urinals that are on a level with the main floor of the toilet room.

6 - cont'd.

— toilet rooms shall have an appropriate number of towel racks, towel dispensers, and other dispensers and disposal units mounted no higher than 40 inches from the floor.

7. Water fountains (an appropriate number) or other water-dispensing means shall be accessible to, and usable by, the physically disabled.

— conventional floor-mounted water coolers can be serviceable to individuals in wheelchairs if a small fountain is mounted on the side of the cooler 30 inches above the floor.

8. Public telephones (an appropriate number) should be made accessible to, and usable by, the physically disabled.

9. Elevators in a multi-storied building are essential to the successful functioning of physically disabled individuals.

— they shall be accessible to, and usable by, the physically disabled on the level that they use to enter the building, and at all levels normally used by the students.

10. Wheelchair turning space required (180 and 360 degrees) is 60 X 60 inches. Actually, a space 63 X 56 inches works even better. A minimum width of 60 inches is required for two wheelchairs to pass each other.

⊛ For more complete information, see Appendix A-55, No. 4

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